The Sight-Saving Review

Volume XXII Number 3

Fall, 1952

Table of Contents

PAGE

"You Have Glaucoma! I Shall Have to Operate . . ."
Avis Pumphrey 130

Disarmament in Washington
Martha Elliott 135

Eye Defects in Three Generations
Jay G. Linn, M.D. 136

Study of Procedures Used for Screening Elementary School Children for Visual Defects
Marian M. Crane, M.D., Richard G. Scobee, M.D., Franklin M. Foote, M.D., and Earl L. Green, Ph.D. 141

The Patient's Reaction to Eye Problems of Middle Age
Margaret F. Gnade 154

The Ophthalmologist in Industry
David H. Rhodes, M.D. 157

Optometry's Contribution to Industry
E. H. Westland, O.D. 160

Selecting and Fitting Protective Equipment
Hal F. Doig 163

The Eye Protection Program at Armco's Butler Plant
John C. Bradrick 166

Results of a Vision Testing Program
J. E. Nichols 170

Eye Care Services—Crippled Children's Programs 176

Leonardo's Optical Studies 177

Around the World 178

Notes and Comment 181

Current Articles 183

Books and Pamphlets 190

Copyright, 1952, by the National Society for the Prevention of Blindness, Inc. Title Registered United States Patent Office.

"You Have Glaucoma! I Shall Have to Operate . . ."

AVIS PUMPHREY

Director, Social Service Department
Montreal General Hospital

The doctor's grave words leave the patient frightened and shaken, but her fighting spirit triumphs. This story of how a well-known director of a hospital social service department courageously surmounted a crisis in her life offers doctor, nurse, medical social worker and patient food for thought.

WHEN as a medical social worker you unexpectedly become a glaucoma patient, your world turns upside down. From this new and uncomfortable vantage point you re-examine some of the proceedings to which you have clung so comfortably and tenaciously through the years. Some hold water and some, you discover, do not.

Take the medical team, for instance. It has always seemed so efficient—the doctor, nurse and medical social worker springing into action when illness strikes. To your surprise and distress you find, as a patient, that it lacks an essential feature—the patient himself.

This idea is subtle and elusive. There is no doubt that in the present set-up the entire attention of the team is concentrated on the patient to his great benefit. The point you wish to make is that *the patient himself is not being included on the team.* He is not put to work, as it were, to assist in bringing about his own recovery. On the contrary he is considered to be a good patient if he is the passive recipient of medical care, meekly obeying orders. As a patient you realize you need to be an active and constructive participant on the team, and you believe you have an important part to play. You are not content to accept a passive role, and you suspect that many patients share your viewpoint. You want to be included in the fight being waged to regain your health. Your attempts to explain your ideas to the doctor have, so far, only succeeded in confusing the issue. This is perhaps not too surprising, since you are none too clear yourself as to what you mean. Demonstration would seem to be the only answer. There is, you are convinced, a subtle but extremely important difference between the chances for health of the patient who accepts treatment with resignation (or alternatively is "uncooperative" or "difficult") and the patient who fights the illness shoulder to shoulder with the doctor, nurse and medical social worker.

Apparent Obstacles

This latter situation, where the patient is at one with the team, must surely create the most favourable atmosphere for a good prognosis. But there appear to be almost insurmountable obstacles—precedent, and resistance to change on the part of the hospital personnel. You, because you know the team members so intimately, are in a peculiarly favourable position to flout precedent. As you consider the situation you realize that the doctor has already taken the important—and sometimes unusual—step of explaining your illness and the treatment he is prescribing in detail. He has, therefore, made it possible for you to experiment. Since you are aware of the team's objective, it should be comparatively easy to join in.

Turning from the general to the particular, you take a look at yourself. As a patient, you are acutely ill and very frightened. This hospital that you know so intimately from your daily work has a new look when viewed from the interior of a hospital bed. You have sufficient understanding of your illness to realize that you may have lost the sight permanently in your right eye, and that your left eye may also be affected. Your personal security is shaken to its foundations. Yet your fighting spirit remains, waiting to be harnessed.

It was only yesterday that you were apparently in perfect health, working in the hospital. During the night something unbelievable happened to your eyes. You were tortured with pain and wracked with nausea. This morning the doctor diagnosed acute glaucoma and your hospital admission was an emergency.

You recall his grave words of an hour ago: "Everything possible will be done to try to save your sight. I shall have to operate, possibly more than once. It is a race against time—and it is complicated. The tension inside your right eye is very great and it must be reduced quickly. As soon as this happens, I shall operate. Of course, if we cannot reduce the tension . . ."

So the medical team is in action—drops in your eyes, injections in your arms, a baker over your body, physical examination, injection in the face, more eye drops.

What Does the Future Hold?

As you lie in bed submitting to these various physical measures, you analyse your situation. Like a child, you are for the time being almost completely self-centered. The shock of the diagnosis is great for it is hard to realize that in the future you may be severely limited in vision. How, you wonder, will this affect you? Will you be able to continue working in the hospital? It shakes your sense of security to think that you may have to leave—or accept some form of dependence on others, if you stay. Will you be able to find your way about without a guide? How will you handle business correspondence? You wonder if it might be better to hand in your resignation rather than risk being a burden to the hospital. It would be devastating to be kept on staff because of sympathy over your affliction. In a wave of panic, you reach the depths of depression and self pity.

The pendulum swings in the opposite direction as you give yourself a mental shake and attempt to be objective. After all, you tell yourself, things

might be worse. You have completed your training in social work and have something of value to offer, even though you may be limited in vision. Agencies that care for the blind use social workers and might actually prefer one who cannot see too well. This encouraging thought does much to restore your morale and you decide that financial strain is unlikely to be a realistic factor in the future. You will be able to paddle your own canoe.

Getting Control

Just the same, this loss of vision is upsetting and you realize you must think it through thoroughly if you are to overcome the urge to panic. If you are going to work effectively towards your own recovery, you must be in control of your emotions. Quite deliberately, therefore, you consider the practical issue of whether you will be able to continue living alone in your comfortable small apartment, cooking your own meals, undertaking the journey through busy traffic—back and forth to the hospital each day. If changes must be made, you believe they can be brought about without too much stress. It is a bridge you can cross later, if necessary.

How will your family—living many miles away—react to this unexpected catastrophe? Will pressure be brought on you to return to the family home? They will be very anxious and concerned when they hear the news. This reminds you that your regular letter home is due today and your mother will worry if she does not hear from you. How should the news be broken to her? Somehow the shock must be cushioned. As you ponder over this matter you realize that the very act of cushioning the shock for your family will, from a psychological point of view, lessen the trauma for you personally. The identification involved tickles your sense of humour and raises your spirits.

Working Out the Problem

A method of handling the problem occurs to you and you ring your bell, asking for the medical social worker. She is soon at your bedside and you talk things over. She readily agrees to write letters for you and you discuss the content. The letter to your mother, it is decided, should explain only that you are having trouble with your eyes and have had to be admitted to hospital where you are receiving expert care. A letter will also go forward, however, to a personal friend who is a nurse, and she will be told the diagnosis and prognosis. This nurse will receive daily bulletins until the crisis is over so that, if your sight should be permanently lost, she will be able to break the news gently to your mother.

This plan relieves your mind greatly, and you are able to discuss your personal responsibilities at home and at work. The medical social worker makes copious notes of matters regarding your work load, also some appointments that must be cancelled. You know that everything will receive attention, so you wash your mind of further anxiety. As you do so, you realize that you have now been able to gain considerable emotional control, and this is all to the good.

Now that you have gained peace of mind and are alone once more you take the next step that you know to be necessary. If the tension in your eye is to be reduced, you must bring about physical relaxation.

Routine of Relaxation

Settling yourself comfortably in bed, you follow a routine you have taught to other patients in the past when they were facing serious illness or an operation. You think, in rhythmic fashion, of various parts of your body, relaxing your muscles as you do so. Toes and fingers—feet and hands—ankles and wrists. Slowly you work through the extremities, up through the trunk of the body, paying special attention to shoulders, neck and face. A wonderful sense of peace steals over you. Half asleep, you are vaguely aware of people entering or leaving the room, but you do not rouse. The hours slip by.

Suddenly you hear a quiet voice—your doctor's. His fingers press gently on your eyelids. You hear him say "seems a little easier." He tests your vision, holding his fingers before your right eye while covering the left one. A few hours ago there was no vision—just opaque white—but now you can see faint shadows. There is a brief conference and a decision—an immediate operation. The peaceful serenity remains and you submit without anxiety to preparations for the operating theatre. "D" day—not so alarming after all.

The operation is performed under a general anaesthetic. When you regain consciousness you find, with gratitude, that only the right eye is covered by the bandage. There is a fair vision in the left eye, for which you offer a prayer of thanks as you drift off to sleep.

Keeping the Mind Clear

For the next three days you live in a vacuum—no visitors—no distractions. Working steadily as a member of the medical team, you keep your mind clear of all anxiety and your body in a state of complete relaxation. Gradually your eyes respond. The moment when the dressings are changed becomes an exciting interlude, full of drama.

The first day the sight in the right eye is the same as it was immediately prior to the operation.

The second day you are aware of your doctor's fingers, held before your eye, as though they were pink sausages. You can count them.

The third day the whole room swims into view. You see your doctor's smiling face. He holds up a book—a handkerchief—a match—and you name them. The crisis is over. You can see!

After that dramatic moment, convalescence progresses smoothly. You take an interest in the radio, visitors, details of your daily work. Exercise is increased rapidly. Stitches come out. Discharge day catches you almost unprepared. In a month, you are back at work, full time.

Have you proved your point—that the patient has a part to play? You are inclined to think you have. Because you were able to identify so easily with the members of the medical team, you joined their ranks almost without their knowledge. The end results have delighted everyone. The doctor, with reason, takes credit for a perfect operation. The nurses are happily aware of their competent nursing care. Only the medical social worker was "in on the plot" and really understood the additional element that was added when the patient joined the team.

Looking over the field of medicine as a whole, you realize that you have been putting into effect a factor that is

already thoroughly appreciated in the fields of psychiatry and public health nursing. In both instances, the wholehearted cooperation of the patient is essential to success. The psychiatrist cannot treat a patient unless the patient pulls his weight. "There are two doctors," the psychiatrist says, "the psychiatrist and the patient." The public health nurse recognizes the same principle, for her teaching is useless unless the patient is willing to carry out the measures outlined. In general medicine and surgery, the development has been slower. You see it, in passing glimpses, as the doctor encourages the patient to get up and exercise soon after an operation.

Encouragement Needed

Occasionally you see the understanding doctor who encourages the patient to fight for his return to health. Nevertheless, in the busy clinic or hospital ward, few doctors are able to take the time—or even see the need—to bring the patient actively onto the team. This is a strange oversight since most doctors would agree that the patient's attitude towards his illness sets the tone of his prognosis to a marked degree. If the patient is determined to get well, and can be given guidance in how he may help to bring this about, he is a real asset. This would seem therefore to be an area in which the medical social worker might take a part, primarily in gaining the doctor's acceptance and secondly in showing the patient how he may harness his energies constructively towards this end.

If your own experience has helped in even a small measure to bring this about, you have not suffered glaucoma in vain.

RICHARD G. SCOBEE, M.D.

Prevention of blindness has suffered a great loss in the death June 22, 1952, at the age of 38, of Richard G. Scobee, M.D., of the Department of Ophthalmology of Washington University School of Medicine, St. Louis, Missouri. Dr. Scobee served in the U. S. Army during World War II and was in charge of the Ophthalmology Section of the School of Aviation Medicine at Randolph Field, Texas. At Washington University he reorganized postgraduate training in basic sciences in ophthalmology, and did research on the oculorotary muscles. He served as chairman both of the Committee on Instruction of the American Orthoptic Council and of the National Research Council-Vision Committee of the Armed Forces.

A valued consultant of the National Society for the Prevention of Blindness, Dr. Scobee is perhaps best known in the field of sight conservation for having headed the ophthalmological part of the research in St. Louis to evaluate various methods of vision screening and to determine the incidence and significance of eye conditions among children of school age. It is most unfortunate that the life of so effective a teacher, research worker and clinician has been cut short.

Ophthalmologists to Meet on Cruise

The 1953 Interim Meeting of the Pan-American Association of Ophthalmology will be held on a Caribbean cruise leaving New Orleans about January 31 and returning about February 15. Inquiries concerning the meeting should be addressed to Thomas D. Allen, M.D., 122 South Michigan Boulevard, Chicago 3.

Disarmament in Washington

MARTHA ELLIOTT

Health Educator
D. C. Society for the Prevention of Blindness

THE campaign to reduce the number of children's eye injuries from BB guns in the nation's capital, one of the projects of the D. C. Society for the Prevention of Blindness, reached a significant milestone the last week in June. The D. C. Commissioners passed police regulations which forbid the sale of BB guns and like weapon toys to youngsters under 18. They forbid anyone to carry BB guns outdoors, unless unloaded and securely wrapped. They allow the discharge of such guns only on supervised ranges, approved by the police.

For two years the District Society has been collecting data on eye injuries from weapon toys. Ten such injuries to youngsters from Christmas guns threw the campaign into high last January. A conference with a score of representatives from community groups in February highlighted two facts. The D. C. ordinances were ineffective in preventing injuries. And parents have not been able to supervise the use of BB guns to avoid the toll of accidents.

The D. C. Society used every means of public information—newspapers, radio, television, talks to groups, direct mail, organization publications and national magazines to acquaint the public with the dangers of BB guns. An interesting by-product of this health education by publicity was the widening circle of friends for the D. C. Society.

When proposed amendments to police regulations were drafted the Society was consulted and succeeded in strengthening the amendments. Before the public hearing on the proposed regulations our staff solicited the aid of every association, club and civic organization which could have even a remote interest in BB gun regulation.

The response was heartening. Twenty-nine representatives of organizations or private individuals appeared at the hearing and asked for improved BB gun regulation. A dozen others sent letters or resolutions to the Commissioners. Seven of the 32 youngsters who had suffered BB gun eye injuries in the last year were convoyed to the hearing by the Society's staff.

Opposition was expected from the gun manufacturers who have successfully blocked adequate regulations to control BB guns in other places. Our intensive publicity campaign made eye safety such a popular cause, however, that little opposition was expressed. Only the National Rifle Association representative asked that BB gun target practice be permitted on police-approved, supervised ranges.

From the experience of other communities, the D. C. Society for the Prevention of Blindness concluded that not only the sale and use, but possession of BB guns must be banned. However, outlawing BB guns in private homes is difficult and the new regulation outlawing possession outside a building (unless unloaded and securely wrapped) should go a long way toward protecting the innocent bystander, who is so often the victim.

Eye Defects in Three Generations

JAY G. LINN, M.D.

Professor of Ophthalmology
University of Pittsburgh School of Medicine

Hereditary eye problems of a complex and serious nature are indicated in this report of a family which has been studied over a period of years. Complete pedigrees for every case; better training of physicians in genetics; and education of authorities and the public are suggested remedies.*

ONE family in three generations has been responsible for 12 cases of blindness or near-blindness from at least 10 different conditions due to structural changes in the eye. These are due to an autosomal dominant gene. We can find none of these conditions in any member of the family before Harriet, from whom the rest of these cases are descended.

Harriet's History

Harriet was a first child, born November 3, 1898. The father had no cases of similar nature on either side of his family, was normal himself; had two children and 10 grandchildren by a previous marriage, all of whom are normal. The mother was a school teacher and a fully-developed woman when she married; she had one other daughter and three sons. All are normal, as are their progeny.

Harriet had aniridia at birth; has always had a marked nystagmus. She tried to attend school but could not do well, although she could read large print. She is reported to have had very small eyes, microcornea or microphthalmus, and developed a severe type of glaucoma in early adult life. This was so severe that enucleation was performed on the right eye in 1944, preceded by a cyclodiathermy, and on the left eye in 1948. I did not see her until 1951 when she was anophthalmic and a comfortably obese woman, pleasant and friendly, and rather proud of most of her family.

She has five living children, Robert, Rebecca, Alice, Stephen and Richard, all of whom have eye anomalies. She gave no history of any dead children, nor of miscarriages, although one would expect on the average an equal number with normal eyes on the basis of Mendelian principles.

Robert—the First-Born

Harriet's first child, Robert, was born in 1917, had aniridia in both eyes, and megalocornea. His left eye was enucleated in 1935 following a penetrating injury. When seen in 1952, he had a large cornea—13 mm wide—with a marked anterior curve that was quite hazy, thickened, and with some vascularity. It was impossible to get lens details through the hazy cornea but at a previous examination he had been told that his lens was floating. Robert lived with his grandparents

*A paper presented at the Annual Conference of the National Society for the Prevention of Blindness held in Pittsburgh, Pa., March, 1952.

until he was of school age, then was sent to a school for the blind. Later he was employed for several years at a workshop for the blind. Now he works as an automobile mechanic during the day, and in his home at night repairs rush-bottom and other types of chairs. He married a girl with congenital cataracts, has one child, Constance, who has congenital nuclear cataracts of a large flat type, a nystagmus, and rather limited vision.

Rebecca—Second Child

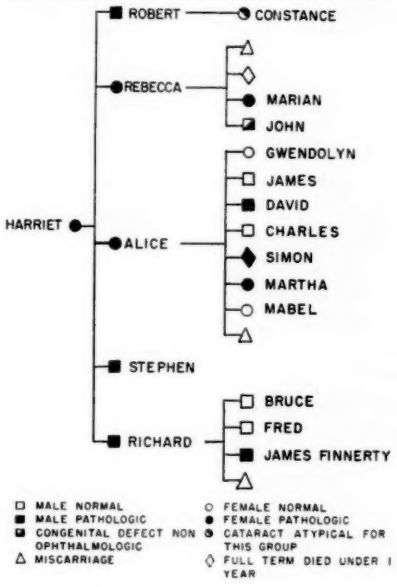
Harriet's second child, Rebecca, was born on March 7, 1922. She has a somewhat frowning expression, a rather marked photophobia, and her eyes are poorly opened. When the lens of her right eye was removed at the age of 6 years she developed glaucoma, for which the eye was enucleated in 1944. The section shows rudimentary iris and atrophic degeneration from glaucoma. Her left eye is congested, especially inferiorly, where there is a leash of vessels coming up from the conjunctiva. There is some microcornea, the cornea being 9 mm wide, and a hyalinized scar of the cornea. Aniridia is present; no iridal remnants can be seen. The lens has a polar-type opacity, both poles being involved with some subcapsular striations.

The visual acuity of Rebecca's left eye is 3/200. Ocular tension is up on palpation, but marked blepharospasm makes impossible a significant tonometer reading. She married a healthy, normal-eyed man in 1944 and has conceived four times. The first was a miscarriage at three months—reported normal. Marian was born in 1946 and has aniridia, polar cataracts, disks slightly pale, and no macular reflex. Her refraction was +3.00 in the right eye and +8.00 in the left eye. The tension was 29 mm Hg (Schiötz), taken under anesthesia. A goniopuncture and goniotomy were performed on the left eye in 1948. The second child, John, was born in 1948 and has normal eyes. However, he had a congenital absence of the radius in both forearms, and clubbed hands, for which conditions operation is to be performed. Rebecca also had one normal full-term child who died at the age of one month.

Alice—Third Child

Harriet's third child, Alice, born in 1924, has a marked blepharospasm, vascularization of the cornea of each eye, with central hyaline degeneration; also aniridia in each eye with remnants of the iris inferiorly. The lens shows polar-type opacities, anterior

CHART I



and posterior. No fundus details are possible due to corneal haze. Acuity in the right eye is 3/200; left eye, 3/200, and cannot be improved with lenses. Tension in the right eye, 40; left eye, 30. This was taken with a Bailliart scleral tonometer. A Schiötz reading could not be taken due to blepharospasm. Alice has had eight conceptions, with six children living. Gwendolyn, born in 1944, has normal eyes, the visual acuity being 20/20 in each, and seems normal in every other way.

Alice married in 1944 and had five children to this husband. James, born in 1944, is normal and has 20/20 vision. David, born in 1946, has aniridia with iris rudiments in each eye, also an esotropia, pendular nystagmus, anterior and posterior polar cataracts, notching of the left lens at 5 o'clock with thinning of the zonular fibres of this area. The anterior surface of the left lens shows many brown spots of foetal iris pigment on its surface, with some stringy and spiral threads present. One of these threads is also present at the chamber angle of the right eye. These findings may have some significance in locating the period of development of the aniridia. The small spots of iris pigment do not have the star shape of ordinary congenital pigmented lens opacities. There is also an irregular transparent opacity of the surface of the posterior capsule of the left lens. Retinoscopy of the right eye shows -2.00 -0.25 cax 105 and the left eye, -1.00 $+0.75$ cax 150. The fundus seems normal and macular reflex is present. Charles, born in 1947, is normal and has 20/20 acuity.

Simon, born in 1948, is said to have had bad eyes but he died at the age of five months. Martha, born in 1949, is structurally different from the rest of the family; is a slender, sallow child having an aniridia in each eye, pendular nystagmus, pole disks, retina albinotic in places. Macular structures could not be seen. There were anterior and posterior polar lens opacities; fundus could be best seen with a -10.00 lens. This child showed no photophobia whatever, and could stand a prolonged ophthalmoscopic examination with no evidence of discomfort.

Alice's husband died in April, 1950, but she has had two more pregnancies: Mabel, born in March, 1951, reportedly at the sixth gestation month, who shows no ocular abnormality at this time; and a stillborn in November, 1951.

CHART II

	ANIRIDIA	CATARACT	GLAUCOMA	ECTOPIA LENTIS	NYSTAGMUS	MICROCORNEA	MEGALOCORNEA	MACULAR DEFECT	SQUINT	CORNEAL SCARRING
HARRIET	x	x	x		x	x				x
ROBERT	x	x	x	x	x		x			x
REBECCA	x	x	x		x	x		x	x	x
ALICE	x	x	x					x	x	x
STEPHEN	x		x							
RICHARD	x		x						x	
CONSTANCE		x								
MARIAN	x	x	x		x					
DAVID	x	x		x	x			x	x	
SIMON	x									
MARTHA	x	x			x			x	x	
JAMES FINNERTY	x	x			x					

Stephen—Fourth Child

Harriet's fourth child, Stephen, had congenital aniridia in each eye. The diagnosis was made by an oculist in Charleston, West Virginia, in May of

1941. Stephen, who has some vision, could not be contacted although much effort was made by myself and others to do so.

Richard—Fifth Child

Harriet's fifth child, Richard, had microcornea and aniridia, according to the diagnosis of an oculist, while he was at a state school for the deaf and blind. During this period his left eye was perforated by a splinter while he was walking in the woods. His right eye became involved, apparently sympathetically, and was enucleated. Nine years later his left eye, which was shrunken and blind, became painful and was enucleated. It showed nothing unusual of a congenital nature, just the picture of an eye atrophic and degenerated from traumatism. There was apparently no iris structure present. Retina and choroid were detached; the lens was shrunken and cataractous.

Richard's wife has had three children and one stillborn. Bruce, aged 3 years, has normal eyes. Fred, 1 year old, has normal eyes. Both children are undernourished and seem rather dull mentally. They are at present in the hospital. The third child, James Finnerty, was born December 30, 1951. He has a pendular nystagmus, aniridia, anterior and posterior polar cataracts, and poorly developed macular retina. The stillborn had apparently normal eyes.

More Cases May Develop

We have in this family in three generations 12 people in whom there are congenital eye defects starting from one apparently mutant gene. Most of the second generation are still quite young. Therefore we shall probably have more cases from that generation. All of the congenitally abnormal eyes show aniridia but one, and that is Robert's daughter, Constance, whose iris is normal but whose lens follows the pattern of her mother and is of the typical congenital nuclear-type opacity. Cataracts have been found in all except Stephen and Richard who undoubtedly have them, but whom I have been unable to examine. This cataract is of the polar type, flat in structure with a connecting central rod. All cases had the same type of opacities. This family would tend to disprove Berlin's statement that persons presenting such defects are less likely to propagate.

All of the family show increased intraocular tension except David, Martha and James Finnerty. As they are very small they may develop it later, since the glaucoma seems to be due to adhesions of iridal remnants to the posterior cornea which interfere with normal drainage of intraocular fluid. Ectopia lentis is probably more prevalent than my findings would indicate in this group, but since I never saw Harriet's eyes and they all develop glaucoma and corneal opacities as their age increases, one cannot see lens structures well enough to make proper diagnoses. I was unable to observe as many cases of macular defect as I feel are present and squint is not as common as one would expect for the same reason. There have been six enucleations performed, one cyclodiathermy, preceding the first enucleation on Harriet. Only two of the enucleated eyes, those of Rebecca and Richard, can be studied. One goniotomy and one goniopuncture were performed, and so far this eye has remained good. Cataract extraction early

in the life of the individual has been recommended and seems logical. This operation was performed on Rebecca at 6 years of age; this eye was blind and enucleated in 1945.

Social Implications

From the standpoint of social service I feel we should consider many things. Four of these people spent ten years of their lives in a state school for the blind and deaf. Three of them are now in a children's institution. Robert is caring for himself and family, I believe very well. Rebecca has a husband who provides for his family. Alice had one, but he died in an accident; and so she has been forced to put her three children in a children's institution as she has no support except a small pension from the railroad. Stephen has not only the handicap of blindness but also has lost both feet due to their being frozen. The mental condition of Rebecca, Alice, Stephen and Richard was given as from dull normal to dull by the principal of their school. There is present a slight speech defect in five of those old enough to speak.

These people are of the stolid, flat or moon-faced type, quite virile. They are able to take care of themselves under ordinary circumstances, but not with any added physical handicap. Whether due to reticence or to a desire not to tell everything, the only statistics of value on these people are based on what you see yourself, not on what they tell you. The third generation are young enough to show a true picture. In this we find 17 people, 7 of whom show gross congenital defects; the others apparently are normal. Four of them are dead due to prematurity, so we are not sure of their eyes. This would thus leave 7 having gross congenital defects out of 13, which is a more true Mendelian average for a dominant gene. There are 2 more grossly abnormal in the third than in the second generation, although the second had 5 more than the first. Geneticists report that people not showing this type of defect at birth do not have the abnormal genes and hence cannot give birth to children with these defects.

Recommendations

A study of this family leads me to concur in the recommendations of Franceschetti in the *Acta of 1950 International Congress of Ophthalmology:*

1. Elaboration of precise and complete pedigrees for every case.
2. Training of physicians, especially ophthalmologists, in genetics, and education of authorities and the public.
3. Extension of facilities for premarital consultation and the general introduction of premarital certificates.
4. Increased use of social workers.
5. Decrease of consanguineous marriages.
6. Decrease of transmission of hereditary eye disease by making sterilization available to the patient, especially when the picture is complicated by oligophrenia.

1953 NSPB Conference

The next Annual Conference of the National Society for the Prevention of Blindness will be held at the Hotel Statler, New York City, March 18, 19, 20, 1953. Plans for this three-day meeting are now under way. For further information write to the Society at 1790 Broadway, New York 19.

Study of Procedures Used for Screening Elementary School Children for Visual Defects: Referrals by Screening Procedures vs. Ophthalmological Findings

MARIAN M. CRANE, M.D., RICHARD G. SCOBEE,* M.D., FRANKLIN M. FOOTE, M.D., and EARL L. GREEN, Ph.D.

This study was carried out with the joint support of the National Society for the Prevention of Blindness, the Children's Bureau of the Federal Security Agency, the Division of Health of the State of Missouri, the St. Louis Board of Education, the Dept. of Ophthalmology, Washington Univ. School of Medicine, and the Office of Naval Research.

THE primary purpose of this study† was to determine the relative efficiency of certain procedures used in screening elementary school-age children for visual defects, as measured by the success of the procedures in identifying those students whom ophthalmological examination showed to be in need of eye care.

Methods

The general plan and methods of the study have been presented in earlier publications[1,2] and will be fully described in a later report. They will be reviewed here only briefly.

The study was conducted in the public elementary schools of St. Louis between February, 1948 and May, 1949. Subjects of the study were 609 sixth-grade students and 606 first-grade students from 14 elementary schools.

Each student was given a complete ophthalmological examination. The ophthalmologist's clinical judgment as to whether or not the student needed to be referred for eye care is the criterion against which the results of the screening procedures are evaluated.

The screening procedures selected for study were administered to the students by three different testers: a technician who tested all of the students included in the study; the nurse serving the school attended by the student being tested; and the student's classroom teacher. As used in reporting the results of the testing, the term "nurse" represents a composite of the findings of 12 different nurse testers, and "teacher" represents the findings of 58 different classroom teachers.

Every sixth-grade student was tested with the following procedures by each of the testers listed for that procedure:

* Deceased.

† Published concurrently in November, 1952 issue of *American Journal of Public Health.*

Judgment. Teacher.

Snellen Test. Teacher, nurse, technician.

Massachusetts Vision Test. Nurse, technician.

Keystone View Company Telebinocular Test. Nurse, technician.

Bausch and Lomb Ortho-Rater Test. Nurse, technician.

American Optical Company Sight-Screener Test. Nurse, technician.

Near Vision Test. Nurse, technician.

The procedures and testers for first-grade students were the same as for sixth-grade students, except that first-grade students did not receive the Ortho-Rater and Sight-Screener Tests. Some of the test charts used in these two procedures are designed for subjects who have more ability to read than is to be expected in first grade.

On the basis of his performance on a given test, each student was classed as either a referral or non-referral by that test.

It is important to note that there are at least three factors that might affect the relative efficiency of the different testers: (1) professional background, (2) training and experience in the testing procedures, and (3) previous acquaintance with the students tested. The technician was given more preliminary training in administering the tests than the nurses, and the teachers had the least training. This was planned, intentionally, to simulate the amounts of training which, in a school vision-testing program, it would probably be practicable to provide for (a) one tester for many schools, (b) one tester for each school, or (c) each classroom teacher. The individual who tests many students naturally acquires more experience in the course of the program than the one who tests a smaller number and the same was true in this study.

Clinical examinations and screening tests were administered as follows:

Ophthalmological Examination. Three ophthalmologists working as a team gave each student a complete eye examination, including refraction under cycloplegia. One of the ophthalmologists evaluated all of the findings and recorded a clinical judgment for each student: "refer" if there was need for eye care, "non-refer"* if special eye care was not needed.

Students referred by a screening procedure who are also referred by the ophthalmologist are considered "correct referrals." Those referred by the screening procedure but not by the ophthalmologist are considered "incorrect referrals" or "over-referrals." Those referred by the ophthalmologist but not by the screening procedure are considered "under-referrals"—students who should be referred but who were "missed" by the screening test.

Teacher Judgment. Before she administered the Snellen Tests the classroom teacher recorded for each of her students whether or not she thought he needed an eye examination. These judgments were based on general observation, but in each school, before the judgments were recorded, the teachers met with a physician or nurse on the study staff for a discussion of the common signs and symptoms of eye trouble. A teacher recorded judgments on all the students in her class

* In an earlier report[2] a third group is described as "theoretical referrals." These are included here in the "non-refer" group.

within a period of a few days, usually on a single day.

There are other ways of obtaining and using the teacher's judgment in a screening program. The data obtained on the accuracy of Teacher Judgment in this study are not necessarily applicable to judgments obtained from teachers in other ways or under other conditions.

Snellen Test. The E symbols on the Massachusetts Vision Test chart were used for tests of visual acuity at a distance of 20 feet. Since these symbols are constructed according to the principles of the Snellen Chart, it was assumed that the test would be the same as a test with a correctly placed and properly lighted E-symbol Snellen Chart.

Massachusetts Vision Test. The procedure followed in administering the Massachusetts Vision Test was that recommended by the Massachusetts State Department of Public Health except that, instead of discontinuing the test when a student failed one part of it, the complete test was given to every student.

Near Vision Test. A test of visual acuity at the reading distance was made by asking the student to read 3 test lines from a chart placed at a distance of 14 inches from the eyes. For sixth-grade students the test lines consisted of 6 letters each from the 14/14, 14/17, and 14/23 lines of the Lebensohn Chart. First-grade students were asked to indicate the position—right, left, up or down—of 4 symbols each in the 14/14, 14/17, and 14/21 lines of the Guibor Chart.

Ortho-Rater, Sight-Screener, and Telebinocular Tests. The manufacturers' instructions were followed in the Ortho-Rater, Sight-Screener, and Telebinocular testing procedures. The tests of color vision which these procedures include were omitted since color-blindness is not a cause for referral for eye care.

Combination of Procedures. The effect of combining certain of the screening procedures was examined. The combinations studied were: Teacher Judgment and the Snellen Test; Teacher Judgment, Snellen Test and Near Vision Test; Snellen Test and Near Vision Test.

Standards for Referral

Some of the standards used in this study for interpretation of measurements obtained on the tests in terms of referral or non-referral have been developed on the basis of data made available for the first time in the study. No standards for referral had been established previously for certain of the procedures. Where standards already existed, these have been applied in interpretation of the study data. If evidence indicated that a standard based on the new data available from the study would give a higher degree of correspondence between the screening test and the ophthalmologist's referrals than was obtained with the pre-existing standard, the results of using both the old and the new standards are presented.

For the Snellen Test two frequently employed standards, or "cut-off" scores for referral, have been used. These are designated as the "high" standard and the "low" standard. A "high" and a "low" standard were used for the Near Vision Test also.

For the Massachusetts Vision Test the standard for referral used is that recommended by the Massachusetts State Department of Public Health.

The manufacturers of the Ortho-Rater and the Sight-Screener have made no recommendations as to how the measurements obtained on these tests should be interpreted. Standards for referral have therefore been developed on the basis of the distributions of test measurements obtained in this study. A later report of the study

Continued, foot of page 145

SCREENING PROCEDURE	MEASUREMENTS ACCEPTABLE FOR NON-REFERRAL	
SNELLEN TEST	**High Standard**	**Low Standard**
Right eye	20/20	20/30 or better
Left eye	20/20	20/30 or better
NEAR VISION TEST	**High Standard**	**Low Standard**
Right eye	14/14	14/17 or better
Left eye	14/14	14/17 or better
Both eyes	14/14	14/17 or better
MASSACHUSETTS VISION TEST		
E symbols		
Right eye	20/20	
Left eye	20/20	
Plus sphere	Unable to read 20/30 line with either eye; or, unable to read 20/20 line with one eye, reads 20/30 line but unable to read 20/20 line with other eye.	
Muscle balance		
Far vertical	Through window	
Far lateral	Through house	
Near lateral	Through panel	

ORTHO-RATER	**Measurement**	**True Value**
Far Point		
1 Phoria, vertical	3–8	1.0 left hyperphoria—1.0 right hyperphoria*
2 Phoria, lateral	2–13	6.66 esophoria—4.33 exophoria*
3 Acuity, both	10–15	20/20 or better
4 Acuity, right	10–15	20/20 or better
5 Acuity, left	10–15	20/20 or better
6 Depth	B–H	†
Near Point		
1 Acuity, both	10–15	20/20 or better
2 Acuity, right	10–15	20/20 or better
3 Acuity, left	10–15	20/20 or better
4 Phoria, vertical	3–8	1.0 left hyperphoria—1.0 right hyperphoria*
5 Phoria, lateral	3–14	7.5 esophoria—7.5 exophoria*

SIGHT-SCREENER		
Far Point—Red Series		
1 Binocular vision	4 letters	Simultaneous binocular vision
2 Acuity, right	20/20–20/10	20/20 or better
3 Acuity, left	20/20–20/10	20/20 or better
4 Acuity, both	20/20–20/10	20/20 or better
5 Depth	D–E	90%–105%†
6 Muscle balance, vertical	2–6	1.0 right hyperphoria–1.0 left hyperphoria*
7 Muscle balance, lateral	8–20	7.0 esophoria—5.0 exophoria*
Near Point—Black Series		
1 Binocular vision	4 letters	Simultaneous binocular vision
2 Acuity, right	20/20–20/10	20/20 or better
3 Acuity, left	20/20–20/10	20/20 or better
4 Acuity, both	20/20–20/10	20/20 or better
5 Depth	D–E	90%–105%†
6 Muscle balance, vertical	2–6	1.0 right hyperphoria–1.0 left hyperphoria*
7 Muscle balance, lateral	7–24	8.0 esophoria—9.0 exophoria*

* Muscle balance (phoria) is measured in prism diopters.

† True value for measurements of depth are available only for the Sight-Screener test of depth, which is based on the Shepard-Fry Scale.

TELEBINOCULAR	Measurement (Cont'd)	Manufacturer's Standard
Far Point		
2 Vertical imbalance	1–1	.5 right hyperphoria–.5 left hyperphoria*
3 Lateral imbalance	8–10	1.75 esophoria–3.25 exophoria*
4 Fusion	3, or 4 then 3	Fusion achieved
5 Usable vision right	5–10	20/25 or better
6 Usable vision left	5–10	20/25 or better
7 Stereopsis	9–12	†
Near Point		
10 Lateral imbalance	4–6	2.81 esophoria–4.70 exophoria*
11 Fusion	3, or 4 then 3	Fusion achieved
12 Usable vision right	13–22	20/25 or better
13 Usable vision left	13–22	20/25 or better
14 Usable vision both	13–22	20/25 or better
		Study Standard—Sixth Grade
Far Point		
2 Vertical imbalance	2–2	1.0 right hyperphoria–1.0 left hyperphoria*
3 Lateral imbalance	7–11	4.25 esophoria–5.75 exophoria*
4 Fusion	3, or 4 then 3	Fusion achieved
5 Usable vision right	8–10	20/18 or better
6 Usable vision left	8–10	20/18 or better
7 Stereopsis	10–12	†
Near Point		
10 Lateral imbalance	3–7	6.56 esophoria–8.44 exophoria*
11 Fusion	3, or 4 then 3	Fusion achieved
12 Usable vision right	14–22	20/22 or better
13 Usable vision left	14–22	20/22 or better
14 Usable vision both	14–22	20/22 or better
		Study Standard—First Grade
The same as sixth grade study standard with the following exceptions:		
Far Point		
5 Usable vision right	4–10	20/28 or better
6 Usable vision left	4–10	20/28 or better
Near Point		
12 Usable vision right	11–22	20/28 or better
13 Usable vision left	11–22	20/28 or better
14 Usable vision both	11–22	20/28 or better

* Muscle balance (phoria) is measured in prism diopters.

† True values for measurements of depth are available only for the Sight-Screener test of depth, which is based on the Shepard-Fry Scale.

Continued from page 143

will give further detail as to how these standards were established.

For the Telebinocular Test the standard for referral recommended by the manufacturer is used. A student is referred if he has any measurement outside of the range shown as "expected" or "doubtful" on the record forms supplied with the instrument. A second interpretation of Telebinocular measurements was based on a standard developed in the same way as the standards for the Ortho-Rater and Sight-Screener. This has been designated as the "Study" standard.

With the combinations of screening procedures, a student is classed as a referral if he is referred by any of the tests included in the combination.

The standards for referral can best be shown in terms of the measurements or scores that are accepted as evidence of satisfactory performance. Any score outside of this range is considered unsatisfactory and an indication for referral. If a student obtains an unsatisfactory score on any part of a procedure, he is classed as a referral by that procedure.

Results

Table I and the figure show the per cent of students correctly referred and the per cent incorrectly referred by the screening procedures as administered by the specified testers. A "correct referral" is a referral by a screening test of a student whom the ophthalmologist found to need referral. An "incorrect referral" is referral of a student who is not referred by the ophthalmologist.

At the top of Table I is shown the per cent of students referred by the ophthalmologist. Below in the same column are shown the correct referrals by the screening procedures. The next column shows incorrect referrals. Thus we see that the ophthalmologist referred 31 per cent of the sixth-grade students. The nurse's Ortho-Rater Test referred correctly 25 per cent, about five-sixths of those it should have referred. The difference between 31 per cent and 25 per cent represents under-referrals—6 per cent of the students tested. At the same time 32 per cent of the students were referred incorrectly. By adding 25 per cent and 32 per cent we find that with this procedure the nurse referred 57 per cent of the students she tested, and that slightly less than half of those she referred actually needed care.

In the figure are two panels, one for sixth grade and one for first grade. The width of a panel represents the total number—100 per cent—of the students tested in that grade. A vertical "zero" line divides each panel so that the portion to the left corresponds to the students referred by the ophthalmologist, while the portion to the right corresponds to the remaining students. Horizontal lines represent the referrals by different screening procedures. The part of a horizontal line on the left of "zero" shows the students referred by both the screening procedure and ophthalmologist; the part of the horizontal line on the right side of "zero" shows the students referred—incorrectly—by the screening procedure but not by the ophthalmologist.

For example, since the ophthalmologist referred 31 per cent of the sixth-grade students, 31 per cent of the total space in the sixth-grade panel is to the left of "zero" and 69 per cent is to the right. The broken line representing referrals by the Ortho-Rater as used by the nurse, extends to the left to the 25 per cent point; this indicates that 25 per cent of all students were referred correctly by that procedure—that is, the same 25 per cent were referred both by the ophthalmologist and by the test. The space between the left edge of the panel—31 per cent—and the left end of the line—25 per cent—shows the students who should have been, but were not referred; this means the test missed 6 per cent, or nearly a fifth of the 31 per cent who should have been referred. To the right of "zero" the line extends to the 32 per cent point, showing that this procedure incorrectly referred 32 per cent of all students. That is, from the students whom the ophthalmologist did not refer, the test referred a group amounting to 32 per cent of all students. Relating the right-hand part of the line to its total length—representing the 57 per cent referred—it is clear that over half the students referred by this procedure were incorrect or "over" referrals. Finally, of course, the space between the right-hand end of the line and the margin

TABLE I

Per Cent of Students Correctly and Incorrectly Referred by Screening Procedures

Test	Tester	Per cent of Sixth Grade Students		Per cent of First Grade Students	
		Referred		Referred	
		Cor-rectly	Incor-rectly	Cor-rectly	Incor-rectly
Clinical Examination	Ophthalmologist	31		23	
Ortho-Rater	Nurse	25	32	*	
	Technician	24	29	*	
Sight-Screener	Nurse	23	31	*	
	Technician	24	23	*	
Telebinocular (Mfr.'s standard)	Nurse	23	38	20	51
	Technician	24	33	18	29
Telebinocular (Study standard)	Nurse	24	33	17	37
	Technician	23	27	15	18
Snellen (high std.) + Judgment and Near Vision (high std.)	Teacher and Nurse†	23	28	18	35
Snellen (high std.) + Judgment	Teacher	21	24	16	25
Massachusetts Vision	Nurse	18	12	15	16
	Technician	20	11	15	16
Snellen (high std.) and Near Vision (high std.)	Teacher and Nurse‡	20	15	16	24
	Technician	18	8	14	13
Snellen (high std.) and Near Vision (low std.)	Teacher and Nurse‡	17	7	15	11
	Technician	14	3	11	7
Snellen (high std.)	Nurse	14	6	12	8
	Technician	14	2	11	7
	Teacher	15	6	13	9
Judgment	Teacher	13	19	10	19
Near Vision (high std.)	Nurse	13	11	13	20
	Technician	11	7	12	8
Snellen (low std.)	Nurse	6	1	5	0
	Technician	7	1	4	1
	Teacher	8	2	4	1
Near Vision (low std.)	Nurse	7	2	6	4
	Technician	5	1	4	1

* Not administered to first grade.

† Snellen and Judgment by Teacher, Near Vision Test by Nurse.

‡ Snellen by Teacher, Near Vision Test by Nurse.

represents the students who were not referred by either the screening procedure or the ophthalmologist.

The data are of course subject to sampling errors but indicate the degree of agreement found between the ophthalmologist and the testing procedures.

Examination of Table I and the figure shows that there is a low degree of correspondence between the referrals by any of the screening procedures and the referrals by the ophthalmologist.

In general, the greater the number of correct referrals, the greater the number of incorrect referrals. Procedures that refer only a small proportion of the students referred by the ophthalmologist give relatively few incorrect referrals, but those that refer more than two-thirds of the students

who really need care give a high proportion of incorrect referrals. Also the greater the number of measurements involved in a procedure, the higher is the proportion of both correct and incorrect referrals.

The Ortho-Rater, Sight-Screener and Telebinocular Tests correctly referred 23 to 25 per cent of the sixth-grade students, or about three-fourths of the 31 per cent referred by the ophthalmologist. This is a high proportion of correct referrals as compared with most of the other procedures. But these tests referred incorrectly an even larger number of students, about 30 per cent of all sixth-grade students. The total referrals amount to at least half the students tested.

When the manufacturer's standard for referral is used with the Telebinocular, correct referrals of sixth-grade students are about the same as those by the Ortho-Rater and Sight-Screener, but there are slightly more incorrect referrals. With the Study standard, the correct and incorrect referrals are both in about the same proportion as those by the Ortho-Rater and Sight-Screener.

Telebinocular testing of first-grade students by the technician gave results very similar to those he obtained for sixth grade, but with somewhat fewer incorrect referrals, especially when the Study standard for referral is used. The nurse's Telebinocular Test referred many more students from first grade than the technician's, and most of these were incorrect referrals.

The difference between the results obtained by the nurse and those obtained by the technician suggests that Telebinocular testing of first-grade students can only be done efficiently by an experienced tester.

The combination of three procedures—high standard Near Vision Test, high standard Snellen Test, and Teacher Judgment—gives results similar to those obtained with the Ortho-Rater, Sight-Screener, and Telebinocular. About three-fourths of the students who need care are referred, but the number of incorrect referrals exceeds the correct referrals. Incorrect referrals of first-grade students are especially high—35 per cent of the entire class and about twice the number of the correct referrals.

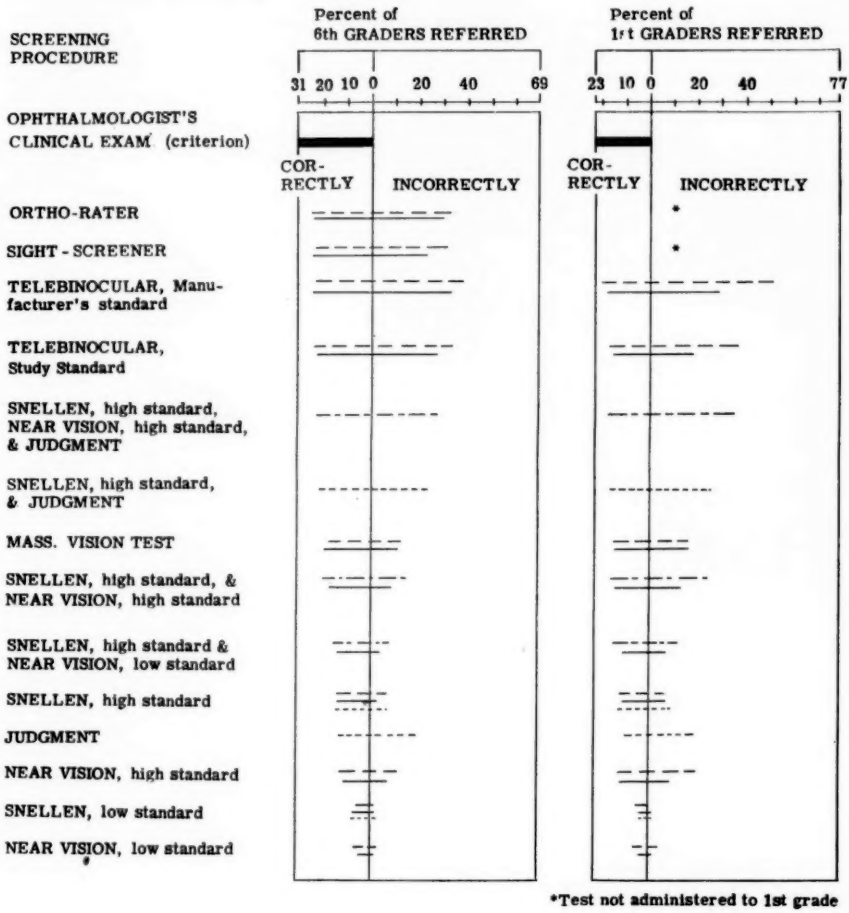
The Massachusetts Vision Test, and the combination of high standard Snellen with Teacher Judgment, both correctly refer about two-thirds of the students who need care. While this proportion is not quite so high as was obtained with most of the procedures discussed previously, there are fewer incorrect referrals. This is particularly true of Massachusetts Vision Test incorrect referrals which, for sixth grade, are between half and two-thirds of the number of correct referrals, while for the first grade correct and incorrect referrals are in about equal proportions.

The nurse and technician are apparently equally efficient in administration of the Massachusetts Vision Test.

The correct referrals by a combination of the high standard Snellen and high standard Near Vision Tests are about the same as those by the Massachusetts Vision Test. The technician referred fewer students incorrectly with this combination of tests than with the Massachusetts Vision Test, but the nurse had more incorrect referrals from the Snellen-Near Vision combination.

FIGURE I

STUDENTS CORRECTLY AND INCORRECTLY REFERRED BY SCREENING PROCEDURES



The nurse's low-standard Near Vision Test, combined with the teacher's Snellen, gives a few more referrals than the Snellen alone, but they are about equally divided between correct and incorrect referrals. The only effect of adding the technician's referrals by the low-standard Near Vision test to those by his Snellen Test is an insignificant increase in the incorrect referrals as compared with the Snellen alone.

The three different testers all obtained very similar results with the Snellen Test. When the high standard is used for referral, the Snellen Test correctly refers about half of the students referred by the ophthalmologist. It misses 10 to 20 per cent more of the students who need care than does the Massachusetts Vision Test, but it refers only about half as many incorrectly.

When the low standard is used for Snellen Test referral the incorrect referrals are reduced to only 1 or 2 per cent of the entire group. But with this standard the Snellen Test selects for referral only about one-fourth or less of the students who need care.

Teacher Judgment as applied in this study referred correctly 10 to 13 per cent of the students, about two-fifths of those referred by the ophthalmologist. But it referred incorrectly a considerably larger number—19 per cent of all the students tested. This is partly responsible for the high proportion of incorrect referrals from the combinations of Teacher Judgment with other tests which have already been discussed.

Those who advocate inclusion of a test of near vision in a screening program suggest that it be used in combination with other tests, not as an independent screening procedure. It is interesting therefore to find that the high standard Near Vision Test alone refers correctly more students than the low standard Snellen Test and almost as many as the high standard Snellen. It gives more incorrect referrals, however, and in first grade there is less consistency in the results obtained by the different testers.

The Near Vision Test, low standard, refers only about one-fourth or less of the students who need care. As has already been indicated, it adds little or nothing to the efficiency of the high standard Snellen Test when the two are combined.

Time Study

To obtain data on the time required to administer the screening procedures, two testers were timed while testing groups of seventh and second-grade students. Conditions were arranged to simulate those of a screening program in a school.

Since the time required for getting the student settled in the proper position for testing and that needed for recording the measurements may vary with different procedures, the time for each test was measured from the moment when a student, readily at hand, was called by the tester to the moment when the next student was called. Identifying data had been entered on record forms by assistants, so the tester recorded only the test measurements.

The methods of administering the Telebinocular, Ortho-Rater, and Sight-Screener Tests were the same as elsewhere in this study. The Massachusetts Vision Test was considered completed at any point where the

student gave an unsatisfactory response, and the simple record form usually used for recording results of this test was substituted for the more elaborate form used in other parts of this study.

A separate Snellen test was not timed, but by timing separately the first part of the Massachusetts Vision Test an approximate measure was obtained of the time needed for a test in which the student is required to read only one or two critical lines of a Snellen Chart. Probably a few seconds longer would be needed for a Snellen Test since the time measured for the first part of the Massachusetts Vision Test does not include dismissing the student.

Testing was done by two experienced testers. The knowledge that they were being timed influenced them to work rapidly, so they may have set a pace somewhat faster than could be maintained over a longer period of routine testing.

The findings from the Time Study are presented in Table II. For seventh grade the results obtained by the two testers differ significantly, but the differences were small and probably not of practical importance. For second grade the results obtained by the two testers were very similar and are therefore combined in the table.

Differences in the time required to administer the Ortho-Rater, Sight-Screener and Telebinocular Tests are probably of little practical importance. But it takes 2 to 3 times as long to give these tests as to give a Massachusetts Vision Test, and the total Massachusetts Vision Test requires about twice as much time as Part 1 alone.

Discussion

It is evident from the data reported that none of the vision-testing methods studied provides more than a rough screening procedure.

The findings of the study show what may be expected from the various screening methods, but they do not permit a conclusion that any one procedure or group of procedures is superior to the others. The screening program that is best in one situation may be less suitable for another.

The choice of a procedure will be determined partly by the purpose of the program. In one situation, as with the testing of poor readers, the purpose may be to obtain the maximal assurance possible that the students who are not referred do not have visual defects. In this case the procedures that give the highest per cent of correct referrals might be preferred, even though they result in a large proportion of unnecessary referrals.

In another situation it may be preferable to use a procedure that gives fewer over-referrals even though it misses more of the students who should be referred.

Recognition that any procedure which refers half or more of the students who need care will give a high proportion of unnecessary referrals may point to a need for education of the community as to what can be expected from a screening program. School health authorities and eye specialists can cooperate in helping parents to understand this. Testers, nurses, teachers, or anyone who informs parents of the results of a screening test should be well-informed as to what a referral by that test may mean and should make this clear to

TABLE II

Time Required to Administer Specified Tests

	Seventh-Grade Students					
	Tester A			Tester B		
	No. of Students	Mean (Minutes)	Range (Minutes)	No. of Students	Mean (Minutes)	Range (Minutes)
Ortho-Rater	20	5.6	4.2–7.0	20	5.8	4.0– 9.8
Sight-Screener	20	5.8	4.6–8.0	20	7.1	4.5–10.6
Telebinocular	20	6.3	5.0–8.3	15	6.5	4.0–10.7
Massachusetts Vision	30	1.7	0.6–3.1	30	2.6	0.5– 4.5
Part 1 of Mass. Vision	30	0.9	0.5–1.4	30	1.2	0.5– 2.8

	Second-Grade Students		
	Testers A and B		
	No. of Students	Mean (Minutes)	Range (Minutes)
Telebinocular	40	8.1	5.6–11.3
Massachusetts Vision	60	2.8	0.9– 5.0
Part 1 of Mass. Vision	60	1.2	0.5– 3.3

the parents. Positive statements that a child has a visual defect are not justified on the basis of a screening test and may destroy confidence in the whole program.

In the study the different testers obtained fairly consistent results on sixth-grade students with all of the tests, which seems to suggest that it is not necessary for the tester to have elaborate training in the testing procedure or long experience with it in order to test this age-group successfully. With first-grade students the same was true for the Snellen and Massachusetts Vision Tests, but there was less consistency in the results obtained by the nurse and technician from Telebinocular and Near Vision Tests at this age level. It may be a characteristic of these tests that they give less consistent results on beginning readers. Or it may be that these tests can be given to beginning readers more successfully by a tester with considerable testing experience.

In general, the results obtained from the testing of first-grade students are enough like those for sixth-grade students to support the belief that screening programs for beginning readers are worth doing.

It is obvious that the way is still open for considerable improvement in procedures for screening elementary school children for visual defects. The many factors involved make the problem extremely difficult. The efficiency of a screening procedure depends in part on the visual functions tested and the accuracy of the methods of measurement possible under ideal conditions and in part on the degree to which the tests are suited to the non-visual capabilities and motivations of the subject. A child may, for example, see a test target perfectly but give an unsatisfactory response if he does not understand what is expected of him, if a sense of frustration leads to poor cooperation, or if the duration of the procedure exceeds his normal atten-

tion-span. The efficiency also depends on whether or not the procedure is simple enough not to require elaborate training of the tester.

Selection of the most appropriate standards for referral is another factor that affects the efficiency of a screening procedure. The method used in this study for developing such standards should—when the later report makes the details available—provide a basis for further study in this area.

It is hoped that the findings of this study will not only be of immediate usefulness to school health authorities in the selection of the screening procedure most appropriate to their programs and in understanding the probable significance of the results of the tests, but will also help to build the foundation for further investigations.

Acknowledgments

Space does not permit making individual acknowledgment of the important contributions made by the many persons who participated in the conduct of this study. Special mention should be made, however, of the cooperation given by the St. Louis Board of Education and its administrative staff, particularly the Director and other members of the Division of Health and Hygiene, and by the principals, teachers and students in the schools in which the study was conducted. This cooperation left nothing to be desired and without it the study would not have been possible.

References

1. Scobee, Richard G. Vision Testing of School Children. *The Sight-Saving Review*, 20: No. 2. 88–98, Summer, 1950.
2. Crane, Marian M. We Study Testing of Children's Eyesight. *The Child*, 15: No. 1, 15–17, August-September, 1950.

Reprints of these references are available, while the supply lasts, from the Children's Bureau, Federal Security Agency, Washington 25, D. C.

A description of the methods of this study and tabulations of basic statistical data will appear as a publication of the Children's Bureau.

1952 Leslie Dana Medal

Miss Grace S. Harper of New York has been designated by the Association for Research in Ophthalmology as the recipient of the 1952 Leslie Dana Award, presented annually by the St. Louis Society for the Blind for outstanding achievement in prevention of blindness work. Miss Harper served from 1920 to 1951 as director of the New York State Commission for the Blind of the Department of Social Welfare. She is now retired.

Schoenberg Lecture

Charles L. Schepens, M.D., of the Howe Eye Laboratory, Boston, will deliver the sixth annual Mark J. Schoenberg lecture at the New York Academy of Medicine on Monday, December 1, 1952.

This lectureship was established as a memorial to the late Dr. Schoenberg's interest in the prevention of blindness. It is sponsored jointly by the National Society for the Prevention of Blindness and the New York Society for Clinical Ophthalmology.

The title of Dr. Schepens' talk will be: "The Prognosis and Treatment of Retinal Detachment."

Safe Play

SAFE PLAY TO SAVE SIGHT is the title of a four-page leaflet recently published by NSPB. It lists as the leading causes of eye injuries to children: blows; sharp objects; falls; BB guns, slingshots, bows and arrows; cinders; and fireworks. Suggestions are given for preventing such accidents to very small children and also to the school-age group. Free single copies are available from the Society at 1790 Broadway, New York 19.

The Patient's Reaction to Eye Problems of Middle Age

MARGARET F. GNADE

Supervisor, Prevention of Blindness Department
Pittsburgh Branch, Pennsylvania Association for the Blind

Helping patients through the difficult readjustment period following even partial loss of vision involves careful study of individual reactions and adaptabilities*

OF all physical ailments eye diseases seem to be the most frightening and bewildering to the average person. Useful vision is so much taken for granted that interruption or interference with it may cause any one of a number of responses, ranging from satisfactory acceptance to complete rejection. Adjustment to such crises varies with the individual. It depends to a large extent on the kind of person he is and the kind of person he has been up to this time. Adjustment to the eye difficulties of middle age and beyond is frequently complicated by other problems peculiar to that age group; for example, waning strength, onset of multiple physical defects, and less hope of future improvement. Probably the most common reaction to the doctor's statement "you have glaucoma" or "you have cataracts" is fear. Basically this implies fear of ultimate blindness but it is complicated by the immediate fear of the treatment involved, its outcome and the future in general. To most people medical, and in particular ophthalmological, terminology is a foreign language, increasing by confusion this fear of the unknown. Either lack of information or acquired misinformation about his eye disease often accounts for an apparently uncooperative attitude in a patient. Early reactions of patients may well bear analysis in the light of the fear involved. For example, the woman who is using drops prescribed for glaucoma. When she instills these drops in the privacy of her bedroom, is she doing so because she is ashamed to let people see her doing it? Is she afraid they will think she is going blind? Or is she herself afraid of becoming blind? Is the man who rejects treatment for an eye disease doing so because he is losing time from work? Or is he really apprehensive that the treatment may ultimately lead to surgery which he fears because to him this implies possible blindness?

*A paper presented at the Annual Conference of the National Society for the Prevention of Blindness held in Pittsburgh, Pa., March, 1952.

Let us think about the cataract patient, never before hospitalized, who is admitted for surgery on one eye. He has no idea what to expect and when he recovers from anesthesia to find both eyes tightly bandaged he is in a panic. He believes his fears of blindness were justified and his resulting emotional upset may affect otherwise good results.

Or consider the glaucoma patient who is told to use eye drops a certain number of times a day but who finds this routine inconvenient, so uses the drops only when he thinks of them. The eye patient is in particular need of reassurance as well as information about his own diagnosis in words he can understand—what the condition is, what he can expect, why certain treatment is recommended, etc. When systemic diseases like diabetes contribute or are closely related to the eye problem, there is need for an even more detailed interpretation before and during treatment. The patient's fear can thus to a large degree be allayed and more satisfactory results accomplished.

Varying Reactions

There are some factors in our social pattern which cause varying reactions in the middle and older age group of people who face eye problems. Fear of dependency may be one of the most devastating. In our civilization, status is related to the ability to earn a living, to support one's family, to be self-sufficient. To most of us vision is of paramount importance in achieving this goal. With employment as competitive as it is, a decrease in vision threatens job security and may lead to change of job or even to forced retirement. However in the middle age group human nature is still resilient and in many instances adaptable enough to make satisfactory adjustment to the effects of the eye disease possible.

Mrs. Smith, a widow in her forties, completely dependent on herself financially, was discharged from her job because rapidly diminishing vision made it impossible for her to perform her duties. The diagnosis was retinitis pigmentosa complicated by maturing cataracts. After a long period of eye treatment and surgery, she found herself with no appreciable improvement in vision and suffering severe emotional depression. However, Mrs. Smith was able to mobilize herself and to undergo a rather rigorous training program in a type of work carefully planned to fit her limitations. Once again she is independent financially; her faith in her own ability is restored, and she is a productive member of society.

In contrast to this is the somewhat older patient who originally held a responsible job as foreman in one of our steel mills. With the onset of eye disease and increasingly poor vision he was unable to continue in this capacity and was shifted to a job within his limitations. The change meant less responsibility, smaller earning power and a severe blow to the man's self esteem. Eventually retirement became necessary for at that point in his life retraining proved to be impossible. This patient could not readjust to the new demands made by decreased vision. He was completely unable to accept his physical limitations and to utilize his other potential resources. His fear of dependency became a reality.

This points up another kind of dependency which is important in any consideration of the middle and older age groups, namely, the possible forced dependency on children or relatives. The added burden of a relative no longer able to manage independently may cause increased tensions within the family group or it may involve readjustment in living conditions, in family relationships, in the whole way of life. Here again reactions vary. There is the grandmother who though living with her children and grandchildren had been able to maintain her independence by taking her part in family activities. Diminishing vision due to cataracts reduced her to a rocking-chair existence, not only because of her own feelings of inadequacy but because of her family's fear that she might harm herself if she tried to move about. She lost interest in everything around her, became very irritable and withdrawn.

Independence Re-established

Following surgery and the restoration of useful vision this grandmother has once more taken her rightful place in the family group. She is doing household tasks with renewed vigor and her former independence is again an established fact. In situations like this it is important that other members of the family group understand the medical problem. It is likely that this patient's depression might not have become so acute if her family had had more understanding of the medical implications of cataracts.

Eye problems of middle and older age may be intensified by other physical disabilities that are common at this time of life. For example, diabetes presents many problems. When these are complicated by an eye disease medical care, plus the full utilization of the forces within the person, plus available community resources may be necessary to effect a satisfactory adjustment. The reaction is not to the eye difficulty alone but to the combination of medical and social problems and their interrelationship. A specific problem in diabetes is maintenance of a controlled diet. Accurate weighing or measuring of food is difficult for the visually limited diabetic. This is usually worked out on an individual basis, but for many of these patients the diet lists could be reprinted in large or bulletin type. Another problem is proper insulin dosage. If the patient is unable to see the fine lines on the syringe clearly there is the constant fear that he may not be getting the proper amount. In such cases someone in the family will have to help or, if that is not possible, the services of a visiting nurse may have to be secured. All the skill of the ophthalmologist, the general practitioner, the medical social worker, and other workers in community agencies may be required to help patients meet these various situations.

In summary, diseases of the eye are often frightening and bewildering. Individual reactions vary and at middle age and beyond are complicated by certain additional factors. Satisfactory results can be achieved only with the full cooperation of everyone concerned in the medical treatment and social adjustment of the individual patient.

A new edition of EYE CUES FOR EYE HEALTH is now available from NSPB at 1790 Broadway, New York 19. This eight-page leaflet is five cents per copy.

The Ophthalmologist in Industry

DAVID H. RHODES, M.D.

Consultant, Pittsburgh Coal Company

AS a medical doctor who has specialized in conditions of the eyes, the ophthalmologist has the greatest responsibility in sight conservation in industry. He must act as the co-ordinator of the various components in the vision program and insure cooperation between management, labor, medical director, ophthalmologist, safety director and engineering staff.

The ophthalmologist must familiarize himself with various types of work and their visual requirements, supervise the visual screening of employees and outline the testing procedure regardless of the selection of tests or who does the testing. He must assist in determining that illumination is sufficient, but without glare, and he must be acquainted with various protective devices and services to safeguard the employee and his eyes.

The relationship between the individual's general health and his eyes is also the concern of the ophthalmologist. Emphasizing this is the comparative infrequency of serpigenous corneal ulcers in the last eight or ten years. I am not referring to the results of treatment but to the lowered incidence of this type of ulcer which, I believe, has accompanied greater resistance in individuals as a result of better nutrition, better oral hygiene and better standards of living.

The ophthalmologist has the following objectives in mind:

1. *The placement of individuals in work commensurate with their visual efficiency.* This involves an analysis of each job to determine the requirements. Some jobs require mainly distance vision; others may need near vision almost exclusively. Operating a crane or tractor requires good central vision, good depth perception and a full visual field. Assembly work is concentrated and close; hence, a convergence insufficiency hampers an employee in this type of operation. Because of the tendency to retinal detachment, high myopes should not be employed at jobs requiring lifting, straining or where subjected to jarring.

In the last issue of the REVIEW *Dr. Daniel C. Braun, medical director, Industrial Hygiene Foundation, discussed the role of the plant medical department in sight conservation. Other components of the vision program are dealt with here in a series of four papers that were presented at the 1952 NSPB Conference, held at Mellon Institute, Pittsburgh, March 19–21.*

A satisfactory visual screening examination is required. Any person whose vision does not correct with lenses should be given a complete ophthalmological examination. This may reveal not only local conditions in the eye but evidence of systemic disease. A complete ophthalmological examination for all employees would be ideal, but any program must be practical. The interpretation of unusual or bizarre findings and recommendations as to the treatment of such is the responsibility of the ophthalmologist. Re-examination at intervals may pay dividends in employees' comfort and safety as well as in productivity.

Provision for correction of visual acuity by qualified refractionists is the third factor in this part of the program.

2. *The elimination or reduction of danger to the eyes.* This is a joint function of the safety director and the ophthalmologist. It involves the utilization of protective glasses and other safety equipment; the use of proper tools for the job, and, just as important, the proper use of tools; the immediate discarding of defective tools and equipment; and the elimination by ventilation of toxic gases or fumes. Foremen and workers should be taught safety precautions and procedures, the proper method of doing the job. Accidents may be prevented if foremen or supervisors recognize the possibility of situations resulting in injury. For example, a window cleaner facing a row of electric welders for several hours sustained welder's flash because he was neither warned nor equipped to guard against such a possibility.

We now see actinic ophthalmia arising from prolonged and improper exposure to sterilizing lamps. In one plant employees chipped ice from the freezing coils of a large commercial refrigerator equipped with sterilizing lamps and learned by experience to avoid such exposure. Similarly, electricians installing such equipment were unaware of the effect of the ultra violet rays produced by the lamps, permitted those already installed to remain burning and as a result suffered the severe discomfort of an actinic ophthalmia.

3. *Obtaining the best possible functional and cosmetic results of eye injuries through proper and adequate treatment.* Unlike the preceding objective where responsibility is shared, the treatment of eye injuries is the sole responsibility of the ophthalmologist. Proper treatment requires a correct diagnosis. The ophthalmologist must outline specifically what treatment is to be used in various situations and should limit first aid care according to the qualifications and reliability of the person performing such duties.

An injury should not be compounded unnecessarily in the treatment. Any case requiring instrumentation should be referred to the ophthalmologist; likewise any injury or alleged injury in which a self-evident minor cause is not found should be referred. Nothing is gained when someone removes a small metallic foreign body from the cornea only to find it necessary two or three days later to send the patient to the ophthalmologist because the rust ring was not removed and the eye continued irritable. Particles of coal, slate and glass are chemically inert, causing

irritation of the eye only by their location. The examination of miners' eyes frequently reveals small particles of slate or coal which have been present in the cornea or conjunctiva for years without causing any trouble. The true nature of an eye condition may be masked by some zealous individual attempting to remove one of these old inert foreign bodies from the cornea before sending the patient to the eye physician. Any injury of doubtful or sufficient severity to require treatment by the ophthalmologist should be treated by him from the beginning. Lacerations involving the eyelids are best repaired by the ophthalmologist.

Delay is Dangerous

An employee complaining about his eyes should be sent for examination. Unfortunately there have been cases where a supervisor, with a distorted idea of maintaining a good safety record, has delayed referring the employee for treatment because the supervisor thought the medical complaint either was trivial or was not of industrial origin. The determination of the cause of any eye condition is the responsibility of the ophthalmologist and is not that of the supervisor. No patient should return to work as long as by so doing the condition might be aggravated or prolonged, or if a safety hazard exists due to impaired function. Before the patient is discharged from treatment the uncorrected and corrected vision should be recorded, a fundus examination should be done and the peripheral visual fields determined by confrontation.

Management and employees both benefit in proportion to how well these objectives are fulfilled. Industry benefits by increased production and decreased insurance costs; the employees by less strain and fatigue in performing their work, fewer accidents with resultant loss in wages and less possibility of impaired visual function as a result of injury.

KEITH LORENZ

In the recent death of Keith Lorenz, chairman of the New York State Labor Relations Board, the National Society for the Prevention of Blindness has suffered a great loss. Mr. Lorenz was a member of the Society's board of directors and also of its executive committee. Over a period of years he gave generously of his time and rendered invaluable service in the field of eyesight conservation.

Born in Pennsylvania, Mr. Lorenz was graduated from Harvard College and from Columbia University Law School. Starting as an attorney in New York, he became an Assistant United States Attorney in 1920, and later he helped to form the law firm of Lorenz, Finn & Lorenz.

Mr. Lorenz served in the first World War, was active in the Officers Reserve Corps, and in 1942 was chief of the local division of the New York Ordnance District. He was appointed a member of the State Labor Relations Board in 1945 and four years later was named by Governor Dewey to be its chairman.

Who Lobbies for Whom?

Recently House and Senate subcommittees cut $181,000 for education of children of migrant workers from the budget of the U. S. Office of Education.

The Department of Interior budget includes the sum of $6,500,000 for the care and protection of migratory birds.

Optometry's Contribution to Industry

E. H. WESTLAND, O.D.

Chairman, Occupational Vision Committee
American Optometric Association*

As a member of the industrial vision team, optometry has a contribution to make which we believe to be of value. However, no one individual or group can have the complete answer on techniques and know-how.

In the industrial field we have been faced with a problem. There are some in our group who feel that their place is to go into industry to determine who and who may not need visual care. There are some who feel that employees should be given a complete refraction within the plant. Our national organization has come to the conclusion that neither of these approaches is desirable. Therefore, we make the statement that optometry's association with industry can best be served by remaining in our offices and administering the visual care to those who need it.

It is not to be inferred that we make no effort to learn the various characteristics of the jobs. On the contrary, we are continuously advising our men to visit the industry and observe the man on the job so as to get a more comprehensive idea of his visual needs.

We believe in long-range planning in industrial vision problems and will only subscribe to a high-type, ethical and professional approach.

We recognize the evils on the horizon and therefore emphasize the important continuation of the doctor-patient relationship.

We recognize the value of properly planned and executed visual screening programs, believing them to be an expedient method of discovering those individuals who may need assistance. We have not endorsed these programs. There are certain evils existing in them, evils which we hope in time will be eliminated. Perhaps the greatest of all is the thought enjoyed by those individuals who pass the tests: "I've just had my eyes examined and there is nothing the matter with them." It is hoped that through the proper approach and education this fallacy can be eliminated.

In serving industry optometry is vitally interested, as are other members of the team, in reducing the number of eye injuries and accidents. Louis Resnick found that eye accidents were occurring in 1940 at the rate of two per minute. This, to me, is significant not only from an organizational point of view but it has personal significance as well. My father spent 37 years in the making of steel, 32 of them with vision in only one eye because injury had cost him the sight of the other eye. I am naturally concerned. I can remember the pain and suffering my father endured and I can also remember the anxiety and worry on the part of our entire family. That happened many years ago, before eye protective devices were given the consideration they now are.

* A paper presented at the Annual Conference of the National Society for the Prevention of Blindness held in Pittsburgh, Pa., March, 1952.

The Committee on Occupational Vision of the American Optometric Association has given much thought to this problem. We have observed that in spite of well organized goggle programs, eye accidents still continue. We believe there are several reasons.

1. It is known that a greater number of eye injuries occur in the small plants, those employing 300 or less. Perhaps this is due to the fact that programs have not been designed to make it economically sound for the smaller plant to adopt them. Thus no program—result, accidents.
2. A number of safeguards on machines in eye-hazardous areas are not being used.
3. Personal eye protective devices are not being worn.

As a profession we can only urge that the first item receive the serious consideration of management.

The second item is partially our responsibility but is mainly the responsibility of the manufacturers and purchasers.

The third item is the responsibility not only of optometry but of ophthalmology and opticianry as well. We believe that the employee will wear his personal safety glasses if they fit him properly, so that they are comfortable and efficient; that such fitting and adjustment cannot be performed by the inexperienced. Furthermore, we believe that the three groups mentioned have the responsibility for the visual safety and welfare of the patient and must be given every opportunity to exercise and discharge that responsibility. Therefore management should be informed to such an extent that it will insist on such services being rendered.

If, perchance, through 100 per cent efficient operation of this prodecure, the employee still refuses to wear the device then we must come to a further consideration. We who have been associated with industry know the usual complaint of the worker: "The goggles are too heavy, they steam up too much." Also, men are vain creatures. They will seldom tell you that they do not wear their goggles because they are unsightly, but if questioned carefully and offered something more attractive in the way of eyewear they will often admit it.

Valid Complaints

Perhaps the employee's complaint is valid and, if found to be, it may then be well for us to devise a pair of safety glasses that are not heavy and unsightly yet will still give adequate protection. Perhaps the day will arrive when the worker will be proud to wear his goggles to work or to church, as well as to see his best girl friend.

Another prevention factor that has been given consideration by our group is visual efficiency. It is known that where well organized eye programs have been put into effect, among the many benefits derived the accident rate has been reduced.

In an effort to enhance the visual efficiency of the worker it becomes necessary to improve visual skills through the aid of lenses, or visual training, or a combination of these. Which of these skills are of greater importance and to what extent they can be improved is now being investigated at several of our colleges. This research includes a study of the con-

striction of form and motion fields, a study on saccadic movements and a study on perception as related to speed and span. From time to time reports on these projects have unfortunately been released without authorization. As with all research, considerable time and investigation is required. Our organization will not make the results public until the data is authenticated and has been discussed with allied groups.

During the past several years it has been pleasing to note the intensive cooperation given the subject of occupational vision by the allied groups. A number of seminars have been held under the sponsorship of our leading universities. At these seminars we find lecturers speaking on subjects of their related fields—government, lighting, management, industrial medicine and surgery, nursing, ophthalmology and optometry. The audience is composed of representatives from all these fields. The program is designed to bring about a solution to existing problems, all for the purpose of making a worker more efficient, safer and happier. These seminars are a contribution which will make for better understanding.

Parents' Institute

The Illinois Society for the Prevention of Blindness lent assistance to the Illinois School for the Blind by requesting Illinois eye doctors to tell parents of preschool blind children about the free institute which was held for these parents at the School in Jacksonville, Illinois, June 6–13.

Those in attendance at the institute were parents who had blind children or children so visually handicapped that they probably will need to be educated as blind children. Parents and their children were housed in cottages at the School. A trained staff cared for the children in a nursery while the courses of instruction were in progress. Those professionally concerned with care and education of visually handicapped children had an opportunity to observe the program on visiting day, June 8.

Where Does Your Charity Money Go?

Freedom of American donors to decide where their charity money goes is today being threatened by monopolistic control of contributions resulting from collective fund-raising, according to Albert Q. Maisel in an article published under the above title in the July, 1952, issue of *Cosmopolitan Magazine*. "A tiny group of professional fund-raisers is trying to take away your freedom to support *specific* causes," says Mr. Maisel, adding, "If they have their way, only one organization—a vast health-and-welfare trust, tightly controlled by a small central board of directors—will be allowed to receive contributions."

That plan, Mr. Maisel reports, is now in operation in Akron, Detroit, Houston, Bristol (Tennessee), Hutchinson (Kansas) and forty other cities. And a strong drive is under way to extend it to at least fifty more.

With control of a billion dollars a year as the stakes, the backers of this scheme have resorted to methods of persuasion amounting to coercion, according to Mr. Maisel. He cites numerous examples showing how this plan appears to be threatening the programs of worthy organizations.

Selecting and Fitting Protective Equipment

HAL F. DOIG

Optician, Pittsburgh, Pa.*

TODAY the average American man can look forward to a birthday cake with 68 candles, whereas in 1900 he might have expected only 50 candles on his last cake. For the added gift of eighteen years he may thank doctors, dentists, nurses, pharmacists, public health workers and others who, in addition to increasing the span of life, can also help fill it with more useful and enjoyable living.

These extra years of life result in the raising of the average age of our industrial workers. They afford time in which to gain greater experience and may represent the period when man reaches his zenith—the time when he is capable of his greatest contribution in his chosen field.

Unfortunately these are also the presbyopic years in which he toils with a lessened visual accommodative ability which if left unattended may see him shunted off into unimportant jobs and eventually out of productive circulation. He may even become an economic problem for society. A primary concern of industry is to rescue these aging eyes and at the same time to identify the other workers in all age groups whose inadequate visual performance makes them less efficient and perhaps easy prey to accidental injury. This is a big field in which the professional and technical services of the optical industry can make a real contribution.

In the case of the industrial worker with a visual problem not only is his own well-being at stake but so is that of society. Management too is rightly concerned, for production and profits are substantially involved. But the difficulty is to get people to take advantage of the help that is available. Happily, this situation is now getting the serious high-level study it deserves. Solutions are forthcoming, solutions based on a sincere approach and void of the narrow, misguided commercial thinking that hinders progress.

Few Short Cuts

Scientific developments in the field of occupational vision have stemmed from the cooperative efforts of the ophthalmic professions and industry and have brought about some short cuts to reaching more workers and the more serious cases. Actually, when a visual program has revealed the need for corrective eyewear there are few if any short cuts to meeting that need. If the busy eye physician could shorten his examination without risk, surely he would do so in his private practice. But all the functions must be performed thoroughly and accurately—from examination through to continued maintenance of the finished glasses.

Prescription eyewear cannot be a packaged item. Subscribing to a visual program wherein the corrective glasses are supplied on a "direct from factory" basis is like buying dentures direct from a dental laboratory. Such practice results in a deficient program,

* A paper presented at the Annual Conference of the National Society for the Prevention of Blindness held in Pittsburgh, Pa., March, 1952.

one more difficult to administer and actually more costly. The real saving is in a program that the worker will welcome, one that really taps this reservoir of potential ability, resulting in greater efficiency, reduced spoilage and reduced absenteeism.

There is a very definite relationship between patient acceptance and the selection and fitting of corrective, protective eyewear. For example, no single frame style made in industrial or dress glasses, regardless of the range of sizes, will fit everyone and any contract to supply a single style for a program will justifiably discourage acceptance. The average worker will take the risk of possible injury rather than suffer all day and every day with poorly fitted, uncomfortable glasses. It seems reasonable then to say that we can't afford to dispense safety glasses without due care in fitting.

Dispensing Program

Briefly, dispensing includes analysis of the physician's prescription, inquiry into the use for which the glasses are intended, selection of materials, determination of sizes, evaluation of the finished product and finally the actual fitting, adjusting and subsequent maintenance. This routine is common practice with ordinary dress glasses and is generally if only roughly understood and expected by the public. Failure to follow the procedure carefully in the case of safety eyewear invites dissatisfaction and affords ample excuse for rejection of the whole program.

Intelligent analysis of the prescription requires optical training and experience. The optician knows, for example, how and what lens changes may affect the patient's comfort. He is familiar with the difficulties that accompany strong oblique cylinders, and he knows what governs the selection of the proper multifocal lens designs. The optician is aware of how dissimilar corrections for right and left eyes may produce unequal magnifications that alter image sizes. Nominal prescriptions, too, have pitfalls which only the experienced optician can recognize. To illustrate, lenses with an innocent looking ℞ such as +200 +100 ax 135 when tilted just 15 degrees change to +219 +103 ax 142. The result, of course, would be an inaccurate interpretation of the prescription. In a cataract prescription the optician knows that a simple +1100 sphere becomes +1150 +50 ax 180 by a small change of the angle of the lens to the plane of the face and he is familiar with the need to compensate in strong powers for vertex distance disparities between the examination and the fitting.

Special Cases

Out of the host of visual aids at the command of the optician a few are especially indicated under certain conditions. In ordinary practice he may protect the tiny growing nose of an infant by using the new improved scratch-resistant, very light weight plastic lens. He may also select this same material to protect the nose of the industrial worker who may otherwise, because of strong power and face structure, have to suffer with large, heavy hardened glass lenses. Some cataract cases present this difficulty especially, and yet in such conditions it is absolutely necessary to maintain the glasses in an accurate position. Plastic lenses, in addition to having the weight advantage, are extremely

safe and are definitely more desirable than glass lenses where conditions of fog, mist or steam exist. Even the safety of the moulded contact lenses should be considered where dust, rain, sleet or snow is a factor in working conditions. With the aid of contact lenses many keratoconus cases have been able to return to useful occupations.

Study and experience enable the optician to recognize basic nose shapes and back of ear contours which with other factors such as the hazards of the job, influence his choice of frame materials. After fabrication comes inspection. Evaluation of the finished industrial safety glasses results in more rejects than the optician finds in ordinary dress glasses because the process of hardening lenses frequently produces waves or distortion and power change. Evaluation includes critical inspection for optical centers, decentration, segment heights and all other measurements in which accuracy is essential. Add to all this the capacity to adjust and maintain protective eyewear correctly, and the importance of adequate dispensing becomes apparent. Certainly the ophthalmic industry should not offer, and management should frown on, any visual program that puts the responsibility of this important function on the shoulders of a shop steward, nurse, safety department clerk or anyone else not fully trained in opticianry. Nor can you expect anyone to acquire the necessary skill by spending a few days in an optical shop!

It is also an unsatisfactory practice, as well as an imposition on opticians, to request that they supply fitting dimensions for industrial prescription glasses, glasses that are finally to be dispensed by a lay person. Would the John Doe Company think of furnishing blue prints of its own products for anyone else to use, or possibly misuse? Of course not, and neither would they think of asking the local tailors to measure up all their employees for suits of clothes that the company intends to supply on a "direct from factory basis." Fitting glasses is an optical job and for truly successful results the full responsibility should remain with optical people. In private practice ophthalmologists safeguard their reputations and protect the value of their prescriptions and the patients who wear them by exercising some control over the manner in which they are dispensed. This is a precaution doubly important, both to eye physician and patient, where safety glasses are supplied. Teamwork of the eye physician and the skilled optician, together with the ophthalmic factories, has much to offer the worker in industry. It can help add candles to his cake and to make them shine ever so much more brightly.

Nurses Reorganize

At the 1952 Biennial Nurses Convention, Atlantic City, June 16–20, five nurses' organizations voted and approved an action, effective immediately, to reorganize and form two national nursing organizations to be known as National League for Nursing and American Nurses Association.

The five organizations that have merged are: American Nurses Association; National League of Nursing Education; National Organization for Public Health Nursing; American Association of Collegiate Nurses; and National Organization of Colored Nurses.

The Eye Protection Program at Armco's Butler Plant

JOHN C. BRADRICK

Safety Adviser
Armco Steel Corporation, Butler, Pennsylvania*

IN the Butler plant of the Armco Steel Corporation we have an organization of 3,700 people engaged in the manufacture of light gauge strip which is shipped in the form of coils and sheets. We also have a wheel works producing forged steel railroad wheels. In addition to the administration and service groups, our departments include all the normal operations from melting to shipping.

Our plant manager and all levels of supervision are directly charged with the responsibility for accident prevention. When an outstanding safety record is made the department receives full credit. If a major injury occurs the department supervisors are invited into the manager's office to outline their program and explain where it failed; they must explain the cause of the accident and what has been done to prevent a recurrence.

Control of eye hazards is one of our major activities. Added to management's backing and active interest, we have the assistance of our plant physician, Dr. J. A. Llewellyn, and Mr. Elmer Best, plant eye technician. The medical department is responsible for the screening of new employees, and reexaminations, and is always ready to help supervision on individual eye problems. Our local eye physicians, optometrists and opticians cooperate to the fullest extent and the optical supply people are helpful in keeping us informed on new equipment and developments.

Before discussing personal eye protection, I should like to mention other means of eliminating eye hazards. The first of these is:

Design

Original design in building equipment to eliminate fumes, dust, chips, flying particles, etc., is fundamental for health, accident prevention and eye safety. For example, the installation of storage tanks and piping to eliminate manual handling of acid greatly reduces this hazard.

Guarding

Welding operations should be segregated and shielded. Safety glass guards should be installed on tool grinders, spot welding operations, and for the protection of charging machine operators.

Lighting and Color

A program of modern lighting is now moving forward in our yards and buildings, and is recommended as a necessary adjunct to eye health and safety. A number of departments have painted their machinery following a recommended color code. The combination of correct lighting and painting does much to raise morale, helps reduce accidents and increases efficiency in all plant operations.

* A paper presented at the Annual Conference of the National Society for the Prevention of Blindness held in Pittsburgh, Pa., March, 1952.

Personal Protection

After eye hazards are eliminated as completely as possible by design, methods, guarding, good tools and safe practices, we must rely on personal eye protection to complete the job. Management has done its part. We employ an eye technician and furnish all plain spectacles, all types of goggles and face shields without cost. We pay one-half on the cost of all prescription spectacles—a liberal policy. The success of the program depends on the supervisory group. Our attitude, our interest and especially the force of our example will be reflected in the men. It is our responsibility to make the eye protection program effective in order to: (1) Prevent eye injuries; (2) improve sight efficiency; (3) reduce accident costs.

Lost Eyes

Since Armco purchased the Butler plant in 1927 we have lost four eyes.

The first was on October 3, 1929, when an employee of the electric construction department was struck on the forehead by a loose spray pipe in the hot mill department. This blow affected the optic nerve and vision was lost in the left eye.

The second case was that of a laborer in the open hearth who lost his left eye on August 29, 1933, as a result of molten metal exploding in water during a furnace breakout.

Third, a pipe-fitter helper lost his right eye on October 3, 1940 when struck by a metal spall from a tool while helping to repair a pump.

The fourth and last eye was lost on December 10, 1942 when a wheel inspector was struck in the left eye by a spall from a metal stencil.

In none of these four cases was the man wearing eye protection of any kind.

Lost-time Cases

For the 24-year period from August 1927 to July 1951 we have had 31 lost-time eye cases. Between 1927 and 1940 there were 11; between 1941 and 1951 there were 20. During the last 10 years the plant has expanded, with an increase in payroll and added eye hazards. This trend indicates the need for more emphasis on eye protection. No major eye injuries occurred during nine calendar years. The last clear year was 1947.

Types of Injuries

Lacerations, various types of burns, and puncture wounds account for a majority of our major eye injuries. Acids, carbon tetrachloride, lime, caustics and scarfing powder accounted for 10, or a third of the cases. Complete eye protection in working with these corrosive materials is the only sure way to prevent injuries. Other accident agencies include our product, equipment, tools and materials used in manufacturing. In fact, an eye injury can be caused by almost anything and may happen anywhere in the plant.

Of the 31 men who suffered major injuries only six were wearing some type of eye protection. This helped reduce the severity and may have saved the vision. A number of maintenance men, a foreman and a superintendent were among those injured. Others were railroad brakemen, electric cranemen, sheet pilers and shearmen who thought they had no eye hazards on the job—further proof that

anybody inside a steel plant may receive an eye injury.

No major eye injuries have been recorded for burners, welders, grinders, machinists, chippers, o.h. pitmen and wheel turners. The men on these jobs recognize the extreme hazard and wear eye protection.

Analysis for 1950

During the calendar year 1950 the Butler plant had a total of 2,685 injuries of which 804, or about 30 per cent, involved the eye. Twenty-five of the total were lost-time cases, and of these two were eye injuries. Our major frequency for the year was 3.39 with a severity of .39.

Of the 804 eye cases 737 were what is commonly called "dust in the eye" —irritations, floating and embedded foreign bodies. Other cases were: burns, 25; lacerations, 14; chemical irritations, 14; flash burns, 9; contusions, 4; and abrasions, 1.

Two hundred and eighty-one, or 35 per cent, of the injuries involved the cornea, and the medical department classified 34 of these as severe. Since every cornea case may cause impairment we were fortunate that none of these had such a result.

Injuries Prevented

During the last four years an average of 2,500 safety spectacles and goggles have been issued annually. We have averaged 392 safety prescriptions a year for the period. This is a commendable job and the volume of equipment supplied undoubtedly has prevented many eye injuries.

For the last six years, from 1946 through 1951, 65 eye injuries, or lost eyes, were prevented as reported by the medical department, foremen or individuals. Many unreported cases undoubtedly occur. One who takes time to talk to these men whose eyes have been saved is convinced that it is worth while to work on an eye program.

Analysis of Hazard

How do we determine whether a job or an operation has an eye hazard? This is accomplished through close observation of the job, and a study of the past record of major and minor eye accidents. The minor accident record, over a period, may prove surprising in frequency and severity and indicate the need for an intensive program. We must always remember that eye injuries are unpredictable and come when least expected. Face, head and ear cases should be included in the study of the accident record since they are likely to involve the eye.

As an example, we selected three departments for a nine-month study. They were not too keen for an eye program and were under the impression they had little or no eye hazard. It developed that the stainless department had 16 cases, the cold mills 23, and the coil warehouse 28. When scattered over a period of nine months the number of these cases may not seem important but when the totals are revealed and investigations are made, the responsible parties are more easily convinced.

Steps in Extending Program

We recommend first that supervision should set the example by wearing safety spectacles faithfully for a period of time before another move is made. Next contact the departmental committeemen and key individuals who are natural leaders. Follow with

one or more meetings with the men in the department, where evidence for the need of eye protection can be presented, also details of the program.

We follow such meetings with individual eye tests, using a screening device; and then provide plano or prescription eyewear as needed.

Individual follow-up is important. Having fitted all employees in the department either with plain or prescription glasses a big job may still be ahead to keep the men wearing them. It is now the foreman's responsibility, with the assistance of the medical and safety departments, to take care of all objections and complaints until everybody is satisfied. Ordinary discomforts can be easily adjusted. Deeper-seated problems such as headaches, sinus trouble or unusual facial characteristics may need the services of the plant physician or specialist.

All complaints must be accepted and followed up on an individual basis until each man is comfortably fitted.

Mr. Bradrick used as the basis of this talk at the NSPB Annual Conference an extensive and interesting series of slides, all made under his supervision and relating directly to details of the Butler plant eye program.

An eye protection program is easy to enforce with new men, if all the longer-service men realize the value of it and cooperate.

Weight is one of the main objections to safety eyewear. There is actually less than a gram's difference in weight between acetate and metal rim safety glasses. Measuring three pairs of spectacles belonging to one man, we found that those with acetate frames weighed 38.21 grams; those with metal rims weighed 37.85 grams; and rimless dress glasses weighed 21.59. The answer to weight is good adjustment.

Cleaning Stations

Another common complaint or objection is fogging and steaming, and the answer to this is frequent cleaning. Our home-made goggle cleaning stations are of solid construction; a small tank contains the fluid, and a container below catches the drip. A tissue dispenser and box for used tissues are provided.

Publicity

To keep interest in the eye program alive we circulate information on prevented injuries, and use publicity matter on the bulletin board. The latter includes posters supplied by the equipment people and those which we make ourselves, using photographs of injuries prevented in our own plant. However, the value of such publicity is doubtful in comparison to personal example and leadership on the part of supervision. For example, I might ask a plant foreman such questions as:

Are you putting your safety glasses on at the start of your working period and wearing them the entire time you are in the plant?

Are you sympathetic to the men in your group who are having discomfort? Remember, it is an individual problem. Are you doing something about it?

Are you requesting the aid of the medical and safety departments on your eyewear fitting problems?

The first eye saved or eye injury prevented will be the reward for all your efforts.

Results of a Vision Testing Program

J. E. NICHOLS

Director of Safety, Reynolds Metals Company
Richmond, Virginia

Some startling facts regarding eyesight conditions among employees are likely to be revealed when a systematic testing program gets under way in a plant. In this case about one-third of the workers were found to have visual defects ranging from minor irregularities to what amounted to industrial blindness. The remedial measures undertaken have yielded so many direct and unexpected benefits as to justify continuance of the program on a company-wide basis.*

IN one of the plants of our company we have a certain colored employee who has worked there for several years as a laborer. He also occupies the respected position of preacher in one of the churches of his community as a sideline occupation. Not long ago, during the course of developing our sight conservation program, this employee was told that he was badly in need of a pair of glasses. In due time he appeared at work with them. They were not just ordinary glasses; the safety lenses were set in a heavy plastic frame with insets of gold trim.

The employee was obviously proud of the dignity which the new glasses added to his appearance. His appraisal of their value was pretty well summed up, however, when he said, "I wore my new glasses to church yesterday for the first time, and I certainly was surprised to see what a fine-looking congregation I have. I hadn't seen them for years!"

At first this was startling, especially as we realized that he had not seen his work for years either! As the program developed, however, we were literally amazed at what we found. Of course we had been told what to expect among our employees, but the real proof came after we had actually examined several hundred of them. We know now that the problem is a big one and that the conditions which we found in one of our plants are neither unique nor unusual. They are to be found in all plants!

We believe in our sight conservation program, and we need no further proof of its value, yet in our company it is still a comparatively new thing. Some of the reasons for our enthusiasm are these: (1) Good eyesight helps to prevent accidents. (2) Employee relations are improved by anything we can do to help employees maintain their own health and well-being. (3) Frankly, we are interested in production, too, and every employee whose vision is something less than normal will be working with an efficiency that is also something less than normal.

There are three fundamental operations in every industry: procurement

* A paper presented at the Greater N. Y. Safety Conference, April 1952.

of goods and services—purchasing; conversion of materials into salable goods—manufacturing; and selling of the goods produced. Procurement of labor is but a specialized extension of the purchasing department which buys labor as a commodity. In buying most commodities you are careful to see that you get what you ordered. But is this so with labor? Do you have specifications for the labor you buy, that is, specifications other than such general terms as carpenter, machinist, crane operator, laborer?

An Expensive Commodity

Labor is the most expensive commodity that you are buying today. It is also the most variable in quality and quantity. How do you measure skills and abilities when you hire a new employee? Do you specify whether or not the job can be filled by a blind person, or even a half-blind person? This is not intended to be a discussion of industrial personnel problems; but I do want to point out that our weakest purchasing procedure today is, very generally, being applied to the most expensive commodity and the one that is hardest to get. An industrial sight conservation program deals with this problem.

It is my guess that four out of five industrial workers today were hired without any kind of pre-employment physical examination. For those who had a physical examination not one in a hundred applicants had an eye test which used anything more than a Snellen chart on the wall. If you have 1,000 employees in your plant, I suspect you would be hard pressed to find 50 jobs for workers with only half their normal eyesight. But it is a fact that about one third of the employees in the average plant now have some defect of vision ranging from a minor irregularity to what amounts to industrial blindness! We found that to be true in our company. I am not speaking now of applicants for employment, but of our present working force, employed for one, five or even 25 years.

Recent trends in industrial employment have increased rather than decreased the responsibilities of the employer toward his employees. It is of increasing importance now to improve the quality of labor as much as possible. Sight conservation offers an unequalled opportunity to do this very thing with a potential return that is almost beyond belief. As an opportunity for improving safety and employee relations it has scarcely been touched.

Selling Management

Getting the approval of management is of course the first thing that has to be done, and this is a selling job. There are some questions that management thinks of immediately. Some of these are: How much of the employee's time does it take? How can I be sure we need this sort of thing? What happens to those whose eyes are found to be deficient? Will the labor unions object? Will the employees expect us to furnish them with glasses? How much will it cost?

Fortunately, the cost of such a program is rather small by any standard of comparison, but most of the other questions can at first be answered only by quoting the experience of other companies. There is another logical question which may be asked, and it is this: If we now go ahead with an eyesight conservation program for our employees, why stop there? Why

shouldn't we also provide a dental clinic, a foot clinic, or give them an individual diet study, or a test for their hearing? One answer to this kind of question is the fact that we have had several mass chest x-ray surveys, and no one denies that they are valuable. It is customary now for us to average 99 per cent participation in chest x-ray surveys, and we don't think of this program as being likely to lead to demands for other services.

Conservation of vision is certainly just as important and admittedly affects a far greater number of employees. If your plant manager wears glasses, ask him how much work he could do without them. You will be safe in saying that 30 per cent of present employees have visual defects which they either do or do not know about, but which definitely need attention by a professional man.

Study the amount of close work done in the plant. How much hand and bench assembly work is there? How much fine inspection work? How many people use calibrated tools and instruments? It is in these classes of employment that you can strike real pay dirt.

Making the Program Work

With your plant management's support, you should next consult with your local professional eye doctors. Tell them what you plan to do and get their reactions and suggestions. In our company it is customary for each employee needing glasses to obtain his own prescription from his own doctor. The glasses are then purchased from any reliable dealer whose office and office hours are convenient for the use of the employees. The glasses are paid for through payroll deduction.

Another point to be settled before the program gets along very far is how much, if anything, the company will contribute toward the cost of the glasses that may be required. This item may be settled in any manner from paying the whole cost to paying none of it. We have customarily furnished eye protective glasses to all who need them and now where it is found that an employee needs prescription-ground lenses in addition to eye protection, we are contributing toward the new glasses an amount equal to the cost of the safety glasses. This plan seems to be working out very well.

Publicity

Making a sight conservation program work is a selling problem—selling to management, to supervision and to the employees themselves. It needs advertising just as any other product which is being sold, and publicity is the lifeblood of the program without which it will wither and fade away. The program and its purposes must be announced throughout the plant in advance and there should be adequate and continuous publicity. Use bulletin boards, plant publications and even payroll envelope inserts for the purpose, as needed. A report to management is necessary and effective after the program has reached the point where some of the results can be evaluated.

Standards

Standards should be prepared carefully with full recognition given to the requirements of each job. The degree of eyesight required for any given job is just as important to consider as the height, weight, brain power and physi-

cal ability of the worker; yet it is one of the things most often neglected. Such employees as crane operators, for example, should have good depth perception. Machinists need good vision at near point. Inspectors should have color perception. There are such standards already available which will be of help in dealing with this problem; it is just as important as the consideration of any other physical characteristic of the employee for the job to be done.

Testing Procedures

There are three instruments which can be used for the actual testing procedure. All of them do virtually the same thing, but with minor advantages for each. What the actual test does when given to each person is to disclose whether or not it would be advisable for him to have his eyes examined by a professional man. It should be made clear to the employee at the time of the examination that the test is not for the purpose of writing a prescription. We found it desirable to give the first eye test to the plant manager or person of highest authority; then the next to be tested were the officers and stewards of the labor union at the plant. The subsequent order of testing was worked out by departments in the manner most convenient to all and with the least disruption of working schedules.

It is quite important that the fears and suspicions of the employees about the purpose of the test be allayed as soon as possible. The first and most common of these fears is that they are being tested so that those with poor vision can be fired from their jobs. Obviously, this should never be the objective of the test nor of the conservation program. Using the testing instrument for screening of applicants for employment is, however, a different matter and the results of the test should be considered along with the other physical qualifications of the applicant.

The testing procedure itself is quite simple, painless and can be done by a nurse or by the safety engineer who has been properly trained. An average of 10 to 12 minutes is required per employee. After the test is finished the employee will want to know right away whether he "passed" or not. That is perfectly natural, but it is better to have the test cards individually examined and rated by a professional person, and then advise the employee of the results by card or letter over the signature of the doctor. In cases where it is quite obvious that there is no visual deficiency we usually do tell the employee and follow up with a confirmation card.

What to Do with the Results

About one-third of any average group of employees will have some sort of visual defect, correctible or not. It is with this one-third that the follow-up work must be done; and this will prove to be a very real service for both company and employees. These individual cases should be handled by someone who has adequate tact and diplomacy for the job and who is in a position to convince the employees that it is to their benefit to see an eye doctor for the needed treatment. The cases will range from the older employee whose eyes show evidence of disease to the bright young stenographer who insists that she needs her glasses, although the test reveals that they are plain lenses with no correc-

tion whatsoever. And there will be a certain number of individuals who have bought their glasses at the dime store and insist that they are as good as any doctor could prescribe for them.

When employees have visual defects that might create hazards to others as well as to themselves—for example, crane operators, truck drivers, etc.,—the problem may become one for joint action by the labor relations department and the safety department.

Those with correctible faults of vision should be referred to a professional man of their choice. They must be followed up, perhaps with a further sales talk, if they neglect to take corrective action. The value of the entire program rests on the number of faulty eye conditions that are actually corrected by glasses where that is possible.

Our Experience

Our experience verifies clearly what the professional men know quite well —that visual difficulties increase with age. If employees are all young, below 26 years, probably not many correctible difficulties will be found; that is, perhaps 9 out of 10 will meet the standards without glasses or further examination. Above the age of 26, however, we learned quickly that we could expect almost anything and we actually found conditions that were almost unbelievable.

The permanent record made at the time of the test should become a part of the employee's personnel record, or his health record. Since the health of a person's eyes is no more certain of being stable than is his health in any other respect, a re-check should be made at a later date depending on the age of the employee and the condition of his eyes as well as the nature of the work he is doing.

Employees soon tell you that they appreciate having the test made, after they are assured that it is completely unbiased, and that they will not be compelled to take any action against their will. One good sales talk is to emphasize that this gives them the opportunity to find out whether they probably should see an eye doctor, without their having to pay for an examination which might not be needed. Those already wearing glasses can be advised as to whether their present glasses are adequate or should probably be changed.

Summary

While my primary interest in organizing the sight conservation program in our company was based on the possibilities for improving our safety record, I am glad to say that many other benefits have been experienced. There was one unexpected feature which we have found most useful. The time spent giving the eye test to each employee afforded our safety engineers, who actually gave the tests, an opportunity to talk safety to each individual employee. Not only eye safety was discussed, but all phases of accident prevention as it was related to each man's job. This included personal protection—safety shoes, gloves —how to lift, and safety practices in crane operation and truck driving. It had never before been possible to discuss safety with each employee alone.

I have testimonial letters from foremen, superintendents and from a plant manager as well as from employees themselves which make it adequately

clear that the employees have sincerely appreciated the opportunity to take the test and they have followed through by getting proper eye care where the need was indicated.

One of the testimonial letters seems to express very well what we are accomplishing with our program at one plant alone and why we intend to make it a continuing procedure:

Dear Sir:

I like my prescription safety glasses very much.

Before I got my prescription glasses, I wore dress glasses. I did not wear them on the job, but left them in my locker.

I can see my work better. We work on a time schedule and before I got my prescription safety glasses I would have to ask someone what time it was or walk over where I could see the clock. Now all I have to do is look and I can see and tell the time.

Yours very truly,

ROBERT FORD
Reduction Department

Wise Owls Honored at Dinner

The Wise Owl Club chapter of Reynolds Metals Company, Phoenix, Arizona, recently gave a dinner at which 12 new members were honored. This chapter has initiated 37 employees since it was chartered in 1949. Of these 31 are still employed at the plant and most of them were able to be present at this unusual dinner meeting. Collectively the chapter members have saved 49 eyes from loss by accidental injury through the proper use of eye-protective equipment. It is noteworthy that one of the new members is an employee who lost one eye through accidental injury many years ago, and thus was saved from blindness in a recent accident because he wore safety glasses.

G. P. Bakken, plant manager, and J. B. Pennington, industrial relations director, both spoke in praise of the purpose of the Wise Owl Club. Presentation of the certificates of membership was made by J. E. Nichols, the company's director of safety.

J. E. Nichols, Reynolds Metals Company director of safety, standing at right, and six Wise Owls at the Phoenix plant. Back row, left to right, Jack B. Carr, Joe A. DuFresne, J. M. Chilcoat; front row, H. H. Ross, Clarence Campbell and E. D. Coleman. This club chapter has 37 members.

Present at the dinner was Clayre A. Pomeroy, who, in September of 1949, was the 1,000th person in the United States to become a member of the Wise Owl Club. Mr. Pomeroy is an enthusiastic worker for eye safety.

The sight conservation program at the Phoenix Plant includes not only all of the usual efforts toward encouraging the use of eye-protective equipment but also the vision testing procedure described by Mr. Nichols in this issue.

Eye Facts.—Sixty Americans become blind each day . . . 420 each week . . . 22,000 during each year. Medical science now has the knowledge to prevent at least one out of every two cases of blindness. But this knowledge is worthless if not put to use.

Eye Care Services —Crippled Children's Programs

AT the request of the National Society the Children's Bureau Division of Research furnished information regarding services for eye conditions under the State Crippled Children's Programs. We are glad to pass on to our readers a summary of state coverage for eye impairments and data on services rendered in 1950.

As the table shows, 19 states, District of Columbia and the territories of Hawaii, Puerto Rico and the Virgin Islands define crippling conditions to include one or more types of eye care.

States which Include Eye Conditions in the Administrative Definition of Crippling Conditions for which Children Are Eligible for Care Under the Crippled Children's Programs—1950

State	Congenital cataract	Refractive errors	Strabismus	Other diseases of the eye except diabetic cataract
Alabama	x	x	x	x
Arkansas	x	x	x	—
California	x	—	x	x
Colorado	x	—	x	—
District of Columbia	x	x	x	x
Florida	—	—	—	x
Hawaii	x	—	x	x
Indiana	x	—	x	—
Kansas	x	—	—	—
Kentucky	—	x	x	—
Maryland	x	x	x	x
Nevada	x	x	x	x
New Jersey	—	—	—	x
New Mexico	x	x	x	x
New York	x	—	x	x
North Dakota	x	—	x	x
Oklahoma	x	x	x	x
Puerto Rico	x	—	x	x
South Dakota	x	x	x	x
Utah	—	—	—	x
Virgin Islands	x	—	x	x
West Virginia	x	—	x	x
Wyoming	x	—	x	x
Total number of states including eye conditions as eligible for care	19	9	19	18
TOTAL number of cases	236	154	3,759	1,261

Of these, 19 provide care for congenital cataract, 19 for strabismus, 18 for other diseases of the eye, except diabetic cataract, and 9 for refractive errors.

From another table, not shown here, we learned that 5,410 or 2.5 per cent of the total children served under the Crippled Children's Programs in 1950 received care for eye conditions. Cases served included 3,759 strabismus cases, 236 congenital cataract, 154 refractive errors and 1,261 other eye diseases. Eye care service was provided in 36 states, including several which do not accept eye cases as such. Actually, however, the bulk of the service was confined to a few states. California, with 3,718, had the largest number of eye care cases, then Puerto Rico 505, New Mexico 271, New York 242, Oklahoma 124, and Alabama 100. It is not likely that these tables showing small numbers of children receiving eye care in many states are a true measure of the need, but rather that they may reflect a shortage of finances and/or case-finding facilities. Where other resources are not now available it seems expedient to explore with the State Crippled Children's agency the possibility of developing services under the Crippled Children's Programs.

Leonardo's Optical Studies

Mathematics and optics formed the basis of all observations of Leonardo da Vinci, who wrote, "The eye which is called the window of the soul is the chief means whereby the understanding may most fully and abundantly appreciate the infinite works of nature. . . . If you historians, poets, or mathematicians have never seen things with your eyes you would be ill able to describe them in your writings."

This year marks Leonardo's quincentenary and in celebration exhibitions of his vast works have been shown in London, New York and Philadelphia.

The optical exhibits display an incredible store of knowledge for one who lived 500 years ago. Among them are working models constructed from Leonardo's drawings of machines for grinding lenses. The exhibit entitled "Optical Study" indicates his knowledge of geometrical optics; it shows the variation in illumination of a room produced by the sun shining through a small hole. Another drawing depicts studies in binocular vision which shows that he understood double vision.

Leonardo emphasized the optic nerves in his drawings of cranial nerves and their attachments to the base of the brain. These drawings also show a study of the eyeball, orbit, optic nerves and ventricles of the brain. Drawings of the skull show his accurate knowledge of the shape of the orbits and their relations with the frontal and maxillary sinuses.

Leonardo da Vinci's achievements in the field of optics as well as in painting, sculpture, architecture and engineering were far in advance of his time and command a profound impression of his ingenuity.

AROUND THE WORLD

ALASKA

Eye Clinics—The Alaska Territorial Medical Association reports plans for regular ophthalmology clinics in Juneau at the local health center on the fourth Tuesday of each month between the hours of 1:00 and 5:00 p. m.

Milo H. Fritz, M.D., of Anchorage has outlined directions for Alaska's itinerant nurses for treatment of phlyctenular keratoconjunctivitis with cortisone, and has recommended that these directions be included in the Medical Standing Orders for the itinerant nurses. Under the plan nurses can teach a member of the patient's family to treat the condition.

ARGENTINA

Glaucoma . . . Theme of 1953 Congress—The official theme of the fifth Argentine ophthalmological congress to be held in Buenos Aires next May is Glaucoma, it was recently announced by Dr. Jose Maria Roveda, secretary. For additional information write to Dr. Roveda at Casilla de Correo, 2699, Buenos Aires.

EGYPT

Campaign Against Blindness—According to the International Association for the Blind, there are now 29 permanent ophthalmic hospitals in the big towns of Egypt, 66 ophthalmic branches in district general hospitals and 19 tent hospitals, 15 of which are traveling—each assigned to a province, remaining in a town for a year and then shifting to another. In addition, there are 200 health centers. Treatment is provided in small, remote villages by ambulatory motor units.

An anti-fly campaign includes spraying DDT or Jamaksin in houses and cattle-breeding places and teaching the peasants the role of the house-fly as a carrier of ophthalmia and other diseases.

Child Welfare Centers make it a rule to require Wasserman Tests for all pregnant women attending. Results of this rule show up in the fact that blindness from syphilis is a rarity in this country.

Early treatment of eye diseases and good eye hygiene are stressed by regular propaganda through broadcasts, films, posters, pamphlets, and articles in popular magazines.

ENGLAND

New Cataract Operation—A paper on *Immediate Problems of the Ridley Lenticulus Implant* was read at a meeting of the North of England Ophthalmological Society, Leeds, November 24, 1951, by Alfredo Arruga. He gave an account of the operation invented by H. Ridley consisting of the replacement of the cataractous lens by a plastic lenticulus. Clearest indication for the operation is monocular mature or hypermature cataracts. The technique uses corneo-corneal section, extracapsular extraction, basal iridec-

tomy through which abundant irrigation is completed; the lenticulus is then engaged in the lower margin of the pupil. The implant passes through the pupil with astonishing ease. The upper and lateral parts of the iris are "eased" over the lenticulus. This appears to be the most important part of the technique. Corneo-corneal nonpenetrating sutures complete the operation.

HAWAII

16-Year Report—*Their Tomorrows Have Become Our Todays* is the title of a report recently issued by the Bureau of Sight Conservation and Work with the Blind in Hawaii, covering 16 years of service, 1935–1951. In an introductory statement, Grace C. Hamman, director of the Bureau, says ". . . we have reviewed not only the activities of the Bureau but have attempted to show the origins and objectives of the pioneers in this field, and to show that Their Tomorrows have, in truth, become Our Todays."

Among 109,247 school children whose vision was tested during 1951, one out of every 10 needed some form of eye care. Only one to 1,700 of the school population tested (109,247) was eligible for enrollment in sight-saving classes.

A study of causes of blindness is currently in process, including all available medical eye reports of the 1,338 blind persons registered in the past 16 years. Already, this study has made clear a decrease in blindness resulting from infectious diseases.

INDIA

New Institute of Ophthalmology—Aligarh Muslim University, in collaboration with Gandhi Eye Hospital, has established an Institute of Ophthalmology for post-graduate study and research in ophthalmology. The Institute is under the Faculty of Medicine of the University, which provides staff and equipment, while the hospital provides the building. Clinical material needed for developing teaching and research facilities is available in abundance at the Eye Hospital and in rural areas served by its mobile units.

Professor A. Leber, M.D., ophthalmologist of Heidelberg, formerly of the University of Goettingen is the director of the Institute. The first term of the post-graduate course in ophthalmic medicine and surgery opened on July 16, 1952. Plans for the future include training programs in allied sciences to provide technical assistants.

Dr. Mohan Lal, chief medical officer of the Gandhi Eye Hospital, recently acclaimed this momentous event and said: "We must build up a sound system of medicine in our country and have a network of research institutes of the type we are starting here. . . . The doors of this Institute and the practical training at the Gandhi Eye Hospital will be available to students of the whole of India and to all the countries of southeast Asia. We will also associate with our contemporaries in the west and place our resources at their disposal in the spirit of mutual give and take."

NEW ZEALAND

POB Report—The *Journal D'Ophtalmologie Sociale*, February, 1952, carries an account of J. Bruce Hamilton's visit last February to New Zealand and his first-hand observations of prevention of blindness activities there. Dr. Hamilton is vice-president

of the International Association for the Prevention of Blindness and chairman of the Prevention of Blindness Committee of the Ophthalmological Society of Australia.

Dr. Hamilton attended the annual meeting of the Ophthalmological Society of New Zealand held in conjunction with the British Medical Association Congress, at which he delivered a paper on prevention of blindness which stressed the Australian program. At these meetings the New Zealand Society proposed to set up a prevention of blindness committee on the lines of the Australian one. The first goal to be reached will be to place trained ophthalmologists in every country district or one ophthalmologist to every 20,000 population.

All main cities of New Zealand have orthoptic clinics attached to public hospitals but, nowhere is there an orthoptist practicing privately nor is there any apparent tie-up between the orthoptist and the sight-saving schools to deal with resistant amblyopia ex anopsia. Eye departments of these hospitals are excellent.

A visit to the Department of Health revealed that excellent records are kept of industrial eye accidents and that eye protective measures in industry are carefully followed.

SOUTH AFRICA

Eye Banks To Be Established—Dr. Karl Bremer, Minister of Health, on February 27 introduced in the South African House of Assembly a bill to legalize use of corneas from dead people for corneal grafting.

The bill provides for removal of tissues for therapeutic or scientific purposes from dead or living human bodies, and will empower relatives or close friends to give permission for the use of a body by medical students or practitioners. It is proposed to set up eye banks under the control of the South African Institute for Medical Research.

UNITED NATIONS

Fund To Combat Trachoma—The Executive Board of the United Nation's International Emergency Children's Fund has approved health projects envisioning the expenditure of approximately $1,000,000 in Africa—a tremendous expansion of its work on that continent. Included are two experimental operations for control and elimination of trachoma in Morocco and Tunisia. The fund, which has not previously attempted to combat trachoma with the necessary prolonged treatment, allocated $175,000 for the work.

WORLD HEALTH ORGANIZATION

79 Full Members of WHO—With the admission of the United Kingdom of Libya as a full member, and Morocco and Tunisia as associate members, World Health Organization now has 79 full members and three associate members. Agreement on the admissions was unanimous, according to the WHO Newsletter for June, 1952.

Fifth Pan-American Congress of Ophthalmology

Word has been received that the officers of the Fifth Pan-American Congress of Ophthalmology, to be held in Santiago, Chile, in February of 1956, have been chosen. They are: President, Dr. Cristobal Espildora; vice president, Dr. Santiago Barrenechea; secretary general, Dr. Rene Contardo; treasurer, Dr. A. Schweitzer.

NOTES AND COMMENT

• *Handicapped Children*

"New York has more than 200,000 children whose development is impeded by physical handicaps," reports Samuel R. Milbank, chairman of the New York State Citizens' Committee of One Hundred for Children and Youth. In an article in the January, 1952, issue of *State Government*, Mr. Milbank emphasizes that "although services for the handicapped have grown rapidly in recent years, many of these children still are not receiving full care and protection. Some are being educated in special school classes, but there are many children in smaller communities for whom such facilities are not available." More adequate allowance of state funds is recommended for the education of certain types of physically handicapped children.

"Necessary medical services," Mr. Milbank states, "are unavailable to many handicapped children; it is particularly important for them to have the services of teams of specialists, all of whom may contribute to the children's special needs, including those of an emotional and social character. Steps should be taken to assure the earliest possible detection of handicapping conditions and the most effective diagnosis and treatment.

"It is important that every effort be made to keep the handicapped in the main stream of social and educational growth so far as possible. It is also important to combat the tendency to concentrate too exclusively on the problems of the more seriously handicapped, and thus give insufficient attention to the larger numbers of children who are less seriously handicapped but who also need special assistance.

"All the physically handicapped would benefit from further coordination between the various individuals and organizations having a special interest in one or another category of the handicapped."

• *TV Effect on Families*

Indications that television is robbing children of needed sleep and to some extent creating eye discomfort are found in a study made recently in Dover, Ohio. Reported in *The News Letter* of the Bureau of Educational Research of Ohio State University are the answers to nine questions asked of the public school pupils:

Thirty-five per cent of the Dover families have TV sets in their homes; 52 per cent have access to their own or neighbor's sets. First choice of programs of primary and intermediate grades is Western stories. First choice of junior-and senior-high school groups is variety shows. More than two-thirds of the parents of primary children guide them in their choice of types of programs. One-third of the parents of junior-high pupils guide them. No adult guidance was reported for high school students.

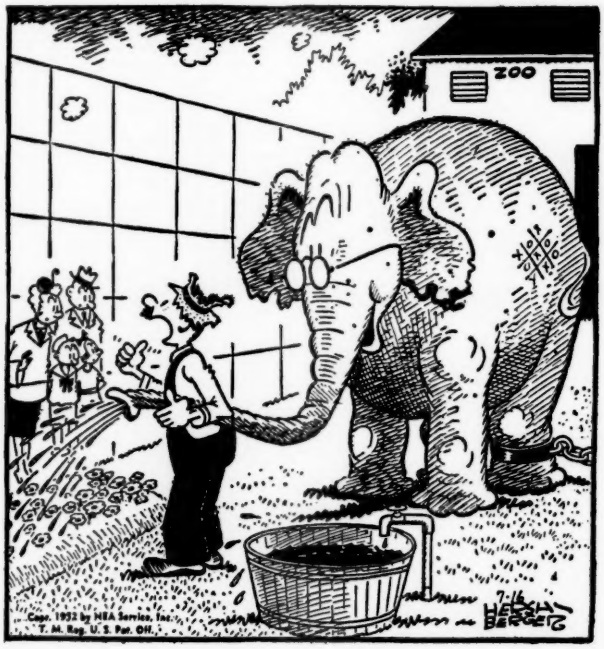
Bedtime hours for elementary pupils averaged one-half to one and one-half hours later than before a TV set was placed in their homes. High school students are going to bed one hour to one and three-quarters hours later. Primary-grade children watch TV an average of three and one-quarter hours a day; intermediate, three and three-quarters hours a day; junior-high, three and one-quarter hours a day; and senior-high grades, two and one-half hours a day.

Of the kindergarten and primary-grade children, 34 per cent said that TV makes their eyes hurt, burn, or itch; 31 per cent of the intermediate-grade pupils so indicated; and eight per cent of the high school pupils indicated eye discomfort.

• *Sight Restored*

Blind trainees have had some sight restored through the vocational rehabilitation services of the Commission for the Blind of the New York State Department of Social Welfare. A July release from the department states that each year a number of persons between 60 and 70 years of age, in good general health, have had sufficient vision restored through medical and surgical care to become employable in such occupations as doormen and service workers.

FUNNY BUSINESS



"I had to get him glasses — he was continually mistaking my straw hat for hay!"
Courtesy NEA Service, Inc.

CURRENT ARTICLES

Retinal Changes Associated with Hypertension and Arteriosclerosis, H. G. Scheie, *The Illinois Medical Journal*, March, 1952, Vol. 101, No. 3, pp. 126–129.

Arteriosclerosis is a general term which designates a group of specific degenerative arterial diseases that includes intimal atherosclerosis and arteriolarsclerosis. Both of these distinct disease entities frequently occur in the retinal arterial system. Intimal atherosclerosis affects only true arteries and is, therefore, found only in the central artery or its branches near the disc. Arteriolarsclerosis is a disease of the arterioles and, therefore, occurs throughout the retinal arterial tree. It is secondary to hypertension and reflects the vascular damage caused by that disease.

Optic Neuritis: A 15-Year Study, F. D. Carroll, *The American Journal of Ophthalmology*, January, 1952, Vol. 35, No. 1, pp. 75–82.

The author has had 240 patients with optic neuritis under his care during the past 15 years. These are divided into three groups according to causes. In the first group (one third) the condition was associated with diseases of adjacent structures, toxic agents, generalized infections, or noninfectious conditions, Leber's disease and vascular disease. In the second group (one third) it was due to multiple sclerosis or allied neurologic disorders. Causes in the last group were unknown. Among the lines of investigation necessary to conquer this disease are allergy of the nervous system, vascular disease, ACTH and cortisone, endocrines and deficiency diseases.

Hydrosulphosol As a Treatment of Chemical Burns of the Eye, R. S. McLaughlin, *American Journal of Ophthalmology*, January, 1952, Vol. 35, No. 1, pp. 21–24.

A series of 52 cases were studied, 26 of which were treated with hydrosulphosol and 26 with the unmodified denuding technique. Results led to the conclusion that hydrosulphosol is only another treatment for chemical burns of the eye, apparently not superior to the denuding technique. The author believes it a questionable preparation because of the misquoted claims that it neutralizes harmful chemicals and, by the laws of chemistry, it cannot be expected to neutralize each and every chemical.

The Phasic Variations in the Ocular Tension in Primary Glaucoma, Duke-Elder, *American Journal of Ophthalmology*, January, 1952, Vol. 35, No. 1, pp. 1–20.

Pointing out the established fact that regular phasic variations occur in the intraocular pressure of most normal eyes throughout the day, the author believes that a regulating mechanism must exist which tends to

maintain intraocular pressure at a physiologic level within a slight habitual rhythmic variation in spite of strains and stresses to which it is exposed daily, and in spite of drastic interference which operative procedures may entail.

In glaucoma the eye seems to have lost the normal power of control so that the rhythmic changes run riot and a gross and uncompensated swing of the pressure occurs. Three theoretical factors are presented to account for the cause of the variations in tension in glaucoma: (1) periodic variation in the formation of the intraocular fluid; (2) variation in the ease of its drainage; or (3) a disturbance in the vascular circulation.

In answer to the first question, experiments have shown that phasic variations are not due to excessive secretion of aqueous, nor, alternatively, to increased diffusion owing to increased capillary permeability.

Concerning the question of drainage, the block appears to be functional, not structural; and considerable evidence is accumulating that its immediate cause is a rise in pressure in the efferent veins. Ease of outflow of aqueous humor depends on the existence of a drop in pressure along the sequence (anterior chamber, canal of Schlemm, aqueous vein, scleral vein), and if the pressure in the scleral vein is higher than that in the anterior chamber, no flow can occur. Provocative tests which confirm this relationship are described.

Cholinergic drugs can minimize the phasic variations in tension and lower pathologic rises of tension in glaucoma by dilating the ocular capillaries, opening up the capillary circulation, and lowering the pressure in the exit veins.

Therefore, the author supports the third theory that glaucoma is a vascular disease. He concludes that the exaggerated rhythm of the ocular tension seen in glaucoma is due to lack of the local vascular control which normally keeps variations of tension within comparatively strict limits. While the fundamental cause is vascular, the nature of the underlying factor is yet unknown.

Conditions Affecting Visual Efficiency in the Railroad Industry, D. Vail, *Industrial Medicine and Surgery*, January, 1952, Vol. 21, No. 1, pp. 9–10.

Factors affecting visual efficiency of the railroad worker are visibility, speed, general and ocular health, visual acuity, ocular motility, fusion, fields of vision, and color sense. Ocular injuries and diseases affecting the cornea are flying particles, chemicals, and virus and bacterial diseases. The author suggests that engineers, particularly those over 50, have their eyes and visual efficiency investigated and evaluated frequently.

Clinical and Pathological Characteristics of Radiation Cataract, D. G. Cogan, D. D. Donaldson, and A. B. Reese, *A. M. A. Archives of Ophthalmology*, January, 1952, Vol. 47, No. 1, pp. 55–70.

Clinical characteristics of radiation cataract in humans are the doughnut-shaped configuration seen with the ophthalmoscope, and the sharply demarcated anterior boundary of the opacity and the bivalve configuration of the opacity seen with the slit-lamp biomicroscope. These are not seen in all stages and are not exclusively found

in radiation cataract, but when present strongly suggest radiation type and are usually sufficient to differentiate the radiation type from posterior polar cataract and cataracta complicata, with which it may easily be confused.

Histologic changes of radiation cataract consist primarily of failure of the cells at the equator to differentiate into lens fibers, and early migration of cells beneath the posterior capsule toward the posterior pole. In general, histologic signs of radiation cataract are less type-specific than are clinical signs.

Glaucoma, A Review of the Literature 1950–1951, H. G. Scheie, *A. M. A. Archives of Ophthalmology*, December, 1951, Vol. 46, No. 6, pp. 677–709.

The author makes the following general comment: "The wide range of opinions expressed in the literature of the past year regarding the mechanism of glaucoma indicates the interest in this vital phase of ophthalmology and serves, also, to underscore our lack of knowledge on the subject. Conclusive objective evidence is lacking for both the neurovascular and the mechanical theory. Even though the arguments of the mechanical school are accepted, and much reliable objective evidence can be found in their favor, the effect of emotional factors, heredity, hormonal balance, autonomic disturbances, and even other factors, cannot be denied. Final judgment should, therefore, be withheld until the results of many more studies are available. It seems most likely that primary glaucoma will be separated into several entities, in some of which one factor predominates, while in others still different factors are at fault."

Circulation of the Aqueous Humour and the Experimental Determination of its Rate of Flow, E. J. Ross, *British Journal of Ophthalmology*, January, 1952, Vol. XXXVI, No. 1, pp. 41–51.

The author, working in the Institute of Ophthalmology in London, developed a direct method of estimating the rate of flow without disturbing the hydrodynamics of the eye, by measuring the rate of disappearance of glucose and galactose from the anterior chamber. By this method the rate of flow in rabbits equals 1.58 per cent per min. of the total volume of the aqueous humor in the case of glucose, and 1.03 per cent per min. in the case of galactose. An indirect method of deriving the rate of flow mathematically, from the equilibrium ratio and the rate of transfer of a given substance from the plasma into the aqueous humor, gives a rate of flow of 1.1 per cent per min., employing sucrose in the normal rabbit and glucose in the diabetic animal.

The Clinical Value of Cortisone and ACTH in Ocular Disease, Sir Stewart Duke-Elder, *British Journal of Ophthalmology*, November, 1951, Vol. XXXV, No. 11, pp. 637–671.

Although cortisone does not cure any ocular disease, it has the great advantage of temporarily blocking inflammatory processes in the eye and thus preventing damage to the eye, particularly if the cause of the disease is eradicable or the inflammation self-limiting. The main gaps in present knowledge are the absence of adequate after-histories, the most useful methods of combating the deleterious effects of chronic inflammatory disease,

and the most efficient techniques for preventing relapses when etiological factors operate over long periods of time.

The Effect of Cortisone and ACTH in Corneal Dystrophy, J. Fulmer, *Southern Medical Journal*, December, 1951, Vol. 44, No. 12, pp. 1105–1106.

The author treated five patients with corneal dystrophy by parenteral administration of cortisone and ACTH and found no improvement except in one in whom a coexistent iritis was present, obscuring accurate conclusions.

ACTH and Cortisone in the Treatment of Ocular Disease, R. W. Smith, Jr., and E. H. Steffensen, *The New England Journal of Medicine*, December 20, 1951, Vol. 245, No. 25, pp. 972–977.

Reviews the literature and calls attention to the current concepts of both etiology and therapy that have emerged from the use of ACTH and cortisone, particularly in the inflammatory ocular lesions. These hormones are now replacing foreign-protein therapy in acute nonspecific inflammatory eye diseases. Therapeutic benefits have not been so apparent in chronic nonspecific eye lesions. Observers of the use of ACTH in the treatment of primary glaucoma report no beneficial results.

A Statistical Survey of 307 Consecutive Cataract Extractions, J. A. Sarrail, *Kresge Eye Institute Bulletin*, May, 1951, Vol. 2, No. 4, pp. 81–93.

A series of 307 consecutive cataract extractions was done during one year. The author groups and classifies these as to sutures used, types of cataract, methods in operative procedure, and number of postoperative complications.

The Inflammability of Plastic Eyeglass Frames, P. Van Portfliet and F. B. Fralick, *American Journal of Ophthalmology*, December, 1951, Vol. 34, pp. 1727–1729.

The authors present a case report of facial burns directly attributable to the ignition of plastic eyeglass frames. A woman had accidentally ignited her plastic frames while lighting a cigarette in bed. She snatched the frames from her face and flung them into her lap, igniting her nightgown and bed clothing. The flames were extinguished by the woman and her husband, and she was rushed to the hospital. She died there a few days later.

To evaluate inflammability of plastic eyeglass frames, 30 sample plastic frames, dating from 1930 to those used at present, were individually suspended on a wire hook and ignited with a common safety match. Rate of ignition and burning characteristics were tabulated. Of the 30 samples, 26 burned violently enough to be a distinct source of danger to the wearer in such a common act as lighting a cigarette. None were found to be strictly noninflammable.

Most plastic frames are made from one of the following materials: (1) cellulose nitrate, (2) cellulose acetate, (3) cellulose acetate butyrate, or (4) acrylic plastic. The high inflammability of nitrocellulose plastics, once the chief material used in plastic frames, has caused their gradual replacement by more recent plastic products—cellulose acetate and cellulose acetate butyrate—both of which possess the

advantage of greatly reduced inflammability. Acrylic material is somewhat brittle but is distinguished for its beautiful color and its slow-burning qualities. The low degree of inflammability of acrylic plastic makes it particularly suitable for use in industrial safety frames.

Constant search for new, more suitable plastic materials is being carried out by the manufacturers of plastic products; however, all other materials tried have lacked one or more of the essential requirements for plastic frames.

The authors suggest that those who dispense eyeglass frames advise the purchaser about the inflammability of plastics.

Cataracts and Retinopathy in Juvenile Diabetics, W. G. Marr, *American Journal of Ophthalmology*, April, 1952, Vol. 35, pp. 577–582.

The author reports a study of 67 juvenile diabetics who are being followed in the Diabetic Clinic at the Harriet Lane Home of the Johns Hopkins Hospital. All the patients at this clinic developed diabetes mellitus before the age of 13 years.

Of 61 juvenile diabetics whose eyes were examined, no diabetic cataracts were found. Under conditions of poor control a cataract may develop in a young diabetic within weeks, but by rigorous therapy it can be greatly reduced or eliminated. Careful regulation of the disease in juvenile patients reduces incidence of cataracts. The author indicates that the patients under study probably represent a group maintaining better-than-average control of diabetes.

Among 37 patients who had had diabetes for less than 10 years, there were two with retinopathy. Among 24 who had had the disease for 10 years or longer, there were 13 with retinopathy. The author concludes that duration of diabetes is paramount in the development of retinopathy. He indicates, however, that the effect of control of the diabetes on the development of retinopathy is harder to determine and that more study is needed to solve this problem.

Surgical Treatment of Glaucoma, A Study of Seventy-Five Consecutive Cases, E. G. Gill, *Virginia Medical Monthly*, April, 1952, Vol. 79, pp. 209–211.

The author describes an operation, iridencleisis, which gave uniformly good results in the treatment of secondary and chronic glaucoma in 75 consecutive cases.

From the standpoint of arresting the disease and relief of pain, the operation proved successful in all the cases. That is to say, tension remained within normal limits. It is not implied that the vision of these patients will remain the same, since frequently the vision will continue to decrease. This is due to damage to the tissues of the eye before the operation.

The Therapeutic Evaluation of Cortisone Applied Topically in Ophthalmic Diseases, J. F. Minnes, *The Canadian Medical Association Journal*, April, 1952, Vol. 66, pp. 342–347.

The author presents 100 cases of various types of ocular lesions that have been treated topically with cortisone. From analysis of the data he says it appears that cortisone administered topically either in the form of drops or ointment is effective in the

treatment of: (1) structures involving the anterior segment of the eyeball rather than the posterior segment; (2) cases of recent onset rather than chronic cases; and (3) ocular lesions due to bacterial allergins, burns, and trauma. It is less effective in inflammatory lesions due to direct bacterial and viral invasion, and not effective in degenerative conditions.

A Not Dominant Glaucoma Pedigree, R. B. Goldschmidt *The Journal of Heredity*, September–October, 1951, Vol. 42, No. 5, pp. 271–272.

The author presents a pedigree in which two grandsons and a grandfather were the only members of the pedigree having glaucoma. He believes this to be either sex-linked glaucoma or recessive inheritance.

The Eye in the Diagnosis of General Diseases, L. V. Kogut, *The Ohio State Medical Journal*, April, 1952, Vol. 48, pp. 305–309.

There are four essentials one must identify in examining the fundus oculi: the optic disk, the macula, retinal vessels and the general appearance of the fundus. Characteristic features of a number of pathological conditions of the eyes are outlined. Among these are primary optic atrophy occurring in tabes and dementia paralytica and other constitutional diseases such as diabetes and pituitary diseases; retrobulbar neuritis caused by toxic amblyopia such as alcohol and tobacco and multiple sclerosis; and optic neuritis which may be caused by complications resulting from meningitis, encephalitis, tuberculosis, syphilis, nephritis, acute febrile diseases, focal infections and other conditions.

Nutritional Amblyopia, A Statistical Report of the Course and Progress in Two Hundred Thirty-Eight Cases, F. C. Rodger, *A. M. A. Archives of Ophthalmology*, May, 1952, Vol. 47, pp. 570–583.

The 238 subjects for this research, which covered a 10-year period, were all former Far-Eastern prisoners of war, who came from three regions: Singapore, Hong Kong, and the "Islands" (Amboina, Java, Borneo, Formosa and Saigon).

It was found that, with a high carbohydrate diet which was low in all the respiratory-enzyme vitamins, the ganglion cells in the central areas of the retina underwent degeneration in the persons afflicted. The subjective defect developed suddenly, resulting in great depression of central vision. After restitution of a full diet to 211 patients the condition further deteriorated in 37.9 per cent, improved in 29.4 per cent, and remained static in 32.7 per cent. The pericentral scotomata characteristic of this condition remained comparatively unchanged, but the slight temporal pallor seen in the subacute stage advanced to a well-demarcated optic-nerve atrophy which bore no relation to the degree of functional loss.

A New Test for Ocular Malingering, R. R. Chace and A. E. Mangold, *A. M. A. Archives of Ophthalmology*, May, 1952, Vol. 47, pp. 637–638.

A test is described and illustrated in which a sheet of circularly polarized material is mounted over a portion of a Snellen test chart. In front of the patient's eyes is held a polarizing instrument, consisting of three strips of circularly polarized material, each ap-

proximately 3 inches long and 1 inch wide, which are fused end to end, the three strips being suspended from a lucite rod 9½ inches long. The chart is placed at a distance of 20 feet and is illuminated in the usual manner. The outermost strip at either end is so placed that the chart can be read normally. The center strip is reversed on itself, so that the light rays are blocked and no light comes through.

In testing the malingerer with one alleged blind or amblyopic eye, the examiner first places the device with the outer strip before both eyes and then moves it along so that the better eye is occluded by that part of the strip while the patient is reading the chart aloud. If he continues to read in an uninterrupted fashion with the so-called good eye blocked off, the visual acuity in the alleged poor eye is better than claimed. The test permits a rapid check on the function of an alleged poor eye and does not have the disadvantage of each eye being tested separately, with a chance for the patient to experiment with his eyes while being tested.

Treatment of Retrolental Fibroplasia with Vitamin E, Corticotropin (ACTH), and Cortisone, W. O. LaMotte, Jr., G. S. Tyner and H. G. Scheie, *A. M. A. Archives of Ophthalmology*, May, 1952, Vol. 47, pp. 556–569.

In summary, the authors say that results with vitamin E, ACTH and cortisone were nearly identical. Among 38 infants treated, 24 became blind, or nearly blind, in both eyes and 14 had normal, or apparently normal, vision in one or both eyes. Evaluation is difficult because of the small number of patients and the unpredictable course of the disease.

Intraocular Acrylic Lenses, A Recent Development in the Surgery of Cataract, H. Ridley, *British Journal of Ophthalmology*, March, 1952, Vol. XXXVI, pp. 113–122.

Mr. Ridley, ophthalmic surgeon at St. Thomas' Hospital and Moorfields, England, describes a new operation in which an artificial lens is inserted in the eye after cataract extraction. So far he has performed this operation on 27 eyes. In the first two cases the acrylic lens was too thick and of too high refractive power. The remaining 25 eyes all contain an acrylic lens of the present specification, and only one, an old man of 75 years whose section was slow to heal, has given trouble. The others are all successful in that binocularly the sight is better than with simple extraction alone. These 24 are surgically satisfactory and have central and circular or nearly circular pupils, lenses in good position, normal tension and no active inflammation.

Mr. Ridley's experience indicates that it is possible to insert an artificial lens into the eye without causing inflammation or glaucoma for at least two years. This operation provides ordinary cataract patients relief from disabilities encountered in the use of very strong glasses. He indicates that over-confidence is unjustified, but the new technique with future modifications may well be the best that can be evolved until biochemical and endocrinological research eventually teaches us how to prevent cataracts developing.

BOOKS AND PAMPHLETS

CLINICAL PATHOLOGY OF THE EYE. A Practical Treatise of Histopathology. Bernard Samuels, M.D. and Adalbert Fuchs, M.D. Paul B. Hoeber, Inc. (medical book department of Harper and Brothers), New York. 1952. 420 p. $20.00.

This textbook, designed to be studied by the pupil and used by the teacher as a basis of instruction, is the work of two eminent eye pathologists, both students of the late Ernst Fuchs. Distinguished for its clear style and practical treatment, it will undoubtedly become a standard authority in this field, serving not only the ophthalmologist but the general practitioner and surgeon as well. Chapters deal with general pathology, the cornea, uvea, sclera, lens, retina, optic nerve and vitreous; also with myopia, tuberculosis, syphilis, post operative pathologic findings, injuries, and tumors.

This is a handsome book, profusely illustrated, and particularly noteworthy because of its fine, clear type.

TEXTBOOK OF REFRACTION. Edwin F. Tait, M.D. W. B. Saunders Company, Philadelphia. 1951. 418 p. $8.00.

Doctor Tait, Associate Professor of Ophthalmology at Temple University, has prepared a clinical discussion of refraction for those who already have a fair knowledge of the eye and of physiological optics. A rather large section is devoted to problems of binocular co ordination in which the author has a special interest.

With regard to school vision surveys, the author recommends ophthalmoscopic examination of all children as an essential step. Although there is no mention of the value of teachers' observation, he considers measurement of visual acuity as the most important of the visual function tests and believes the Snellen chart satisfactory for this. He feels that visual acuity slides in stereoscopes "have a somewhat limited validity, because accommodative variations are induced by the proximity of the apparatus."

There is an excellent discussion of ways of helping those with subnormal vision through the use of telescopic spectacles and other aids.

OPHTHALMOLOGY. Arno E. Town, M.D. Lea & Febiger, Philadelphia. 1951. 512 p. $10.00.

This is a text of particular value for the undergraduate student and the general practitioner. It deals more fully with those conditions of the eye which the general physician is called upon to consider in everyday practice; but for the benefit of those who desire more detailed discussion references have been made to the literature.

Particular emphasis has been placed on the use of the ophthalmoscope and the interpretation of the fundus picture. "Remembering its common em-

bryological origin with the brain," says Dr. Town, "we may consider the eye as the frontier of the central nervous system where signals of distress in that vital center are registered for our early observation. It is in the eye, alone, that the blood vessels can be seen in their nakedness, reflecting the status of the vessels throughout the body; and in this most delicately constructed of our organs, signs of systemic infections attacking the individual frequently are seen before they become manifest elsewhere. . . . We have tried to impress on the student that the ophthalmoscope is as important as the stethoscope to him in making a routine physical examination."

Eleven contributors have assisted Dr. Town in the preparation of the book. Chapters deal successively with objective examination of the eye, physiology of vision, correction of optical defects, various parts of the eye and adnexa, anomalies, diseases and therapy. There are additional chapters on glaucoma, neuro-ophthalmology, ocular changes in general disease, therapeutics, eye injuries and surgery.

COLOR IN BUSINESS, SCIENCE AND INDUSTRY. Deane B. Judd, Ph.D. John Wiley & Sons, Inc., New York. 1952. 404 p. $6.50.

Dr. Judd explains the difficult subject of the psychophysics of color in practical terms—in terms of the purchase, production and sale of commodities where color has an important bearing on their usefulness and price.

Though we may fail to realize it, the judgment of color permeates our industrial life. The farmer, the miner, and the manufacturer judge the worth of raw materials, produce, finished products and consumer appeal in relation to color. In the complicated network of processes that make up economic life we use our eyes to choose among competitive products—either raw or processed materials. To carry out this inspection, color measurement, and selection there have been developed various tools and technics. The purpose of this book is first to tell how the eye works, second to list the tools available to assist in color measurement, and third to show how to select the best tool for a given color-measuring job.

Under tools and technics some of the subjects covered are spectrophotometry, fundamental standards in colorimetry, reproduction of pictures in color, uniform color scales, color standards and languages. The section on physics and psychophysics of colorant layers deals with gloss, opacity, Kubelka-Munk analysis, identification and formulation of colorants.

The book is based on questions asked of Dr. Judd by thousands of persons in commerce and industry during his more than 20 years with the National Bureau of Standards. Since 1946 he has been chief of the Bureau's Colorimetry Unit.

SYSTEMIC OPHTHALMOLOGY. Arnold Sorsby. C. V. Mosby Company, St. Louis, Mo. 1951. 736 p. $15.00.

The eminent author points out that the term medical ophthalmology has become too narrow, because the general aspects of eye disease carry surgical, obstetric, metabolic, dermatological and other implications no less than those of a purely medical character. Thus the title Systemic Ophthalmology has been used for this book. It represents the work of some thirty

collaborators, since the field is now so wide as to be beyond single-handed effort.

Six main sections deal with prenatal pathogenic influences; inflammation, allergic reactions, and infections; nutritional, metabolic and endocrine disturbances; central nervous system; cardiovascular and haemopoietic systems; other general disturbances. The sections in turn are divided into chapters for each of which one of the collaborators is responsible. For example, Algernon B. Reese and Frederick C. Blodi have contributed a chapter on "The Relation of Prematurity to Ocular Anomalies in Postnatal Development." Alan C. Woods has contributed chapters on ocular tuberculosis, sarcoidosis and brucellosis. W. Martin Grant deals with drug intoxications and chemical injuries; David C. Cogan with radiant energy.

The book is illustrated with hundreds of charts and photographs, including 38 color plates.

INDIVIDUAL DIFFERENCES IN COLOUR VISION. R. W. Pickford, Ph.D. The Macmillan Company, New York. 1951. 386 p. $5.00.

The aims of the research on which this book is based were three-fold: (1) to make an efficient test of color vision which reveals the differences between people with normal sensitivity, which compares them directly even with the most defective, and which distinguishes clearly between the different kinds of defects; (2) to use this test to study variations of color vision, to discover the types of variation, their frequency and distribution in the population, the way they are inherited and affect the individual in daily life; (3) to throw light upon theoretical problems of color vision, and to discover which color vision theory most adequately accords with the facts.

Dr. Pickford, senior lecturer on psychology at Glasgow University, gives full details of the apparatus and of the technics of testing used over a long period on several hundred individuals in the Psychological Department of the University. It is his belief that color vision testing is a matter for the clinical expert, and that there is much more risk of under- than over-estimating any defects the subject may have.

DRIVER EDUCATION FOR ADULTS. Center for Safety Education, Division of General Education, New York University, New York, 1952. 16 p. 15 cents.

The need for educating the adult driver is an established fact. This pamphlet tells how this need is being fulfilled through programs of official public agencies, programs of private agencies and program aids such as psychophysical tests, films and publications.

For fastest results communities should take advantage of the well-organized instruction now available. In New York State alone there are over 100 public school evening courses. Short "refresher" courses are being undertaken as part of the safety programs of insurance companies and safety councils. Commercial driving schools, which in 1950 enrolled a million license-seekers, can contribute to the endeavor by improved standards of instruction. One of the best organized types of program is that used by commercial fleets for selection and training of their drivers.